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The Canadian Entomologist

VOLUME XXXIII.

No. 1.

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REV. C. J. S. BETHUNE,

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EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

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LIFE-HISTORY OF XYLINA BETHUNEI, G. & R.

BY HENRY H. LYMAN, MONTREAL.

On the evening of 17th of April, 1898, a ♀ of this species entered my room, and was bottled and not looked at again until the morning of the 19th, when it was found that the cyanide in the bottle was exhausted and that the moth was still alive and had laid a considerable number of eggs. The eggs were distributed through the cotton wool at the bottom of the bottle, and this had to be carefully pulled to pieces thread by thread to secure the eggs.

The following description was taken:

Egg.—Somewhat of gumdrop shape, .60 mm. in diameter, wider than high. Many low ribs rising from the base, the whole surface pitted with rather large depressions having the appearance near the apex of short transverse striæ. Colour when laid, creamy with a tinge of green, soon turning whitish and then soon showing a mottling of brownish red. Later they turned darker, but the mottling remained; hatching 1st and 2nd May. Egg period about 14 days.

Young larva.—Stage I: Length, at rest, 1.42 mm.; in motion, 1.70 mm. Head large, considerably exceeding the 2nd segment, lower part projecting forward. Colour creamy white, but with a darker interior shade beginning at the 3rd segment and extending about two-thirds to anal end, but darker and more marked on the anterior segments. Setæ long, concolorous, as are also the feet and claspers.

The larvæ were offered wild cherry, red-oak bud, hawthorn, silver maple, white birch, willow, plantain, ash, apple. They ate several of the foods offered, but preferred cherry, maple or apple; hawthorn, birch and plantain were not touched.

By the 5th May the general colour was a pale green, the interior shade being dark green, though some did not show the darker interior shade, being uniformly pale green.

Passing 1st moult 7th May; described 9th May.

After 1st moult.—Stage II: Length 6 mm. Head pale greenish with a few white hairs, ocelli black. Body pale green, dark green interiorly, with a whitish subdorsal line, and a similar subspiracular line. Warts whitish.

By the 12th some had passed 2nd moult.

After 2nd moult.—Stage III: Length 8.60–9.40 mm. Head pale horn colour. Body green, darker, especially interiorly, above, yellowish green below. There is now a very broken dorsal line of short white dashes. The warts are conspicuous, being of a shiny white, like glazed china. Setæ short and whitish; spiracles very inconspicuous. These larvæ are sometimes restless, but do not tend to stray from the food-plant. They constantly spin threads, so that when picked up with a camel's-hair pencil they are sometimes pulled back by the thread.

While under observation one began to clear away the frass from the maple leaf it was on, picking the pieces up with its jaws and throwing them aside. One mass so thrown consisted of six or more pellets stuck together.

By the 15th nearly all had passed the 3rd moult.

After 3rd moult.—Stage IV: Length, at rest, 12 mm.; in motion, 14.5 mm. Very evenly cylindrical, but with a slight fullness about the 12th segment. Head very pale green with a few whitish hairs, mouth-parts whitish, ocelli rather inconspicuous. Body green with yellowish shades, especially at the segmental folds. Warts as before.

The white lines are the same as before, but the subspiracular fold is strongly marked and is yellowish white. There is an indication by white dots of another line between the subspiracular fold and subdorsal stripe. The spiracles are small and very inconspicuous. Feet and claspers pale greenish.

Passing 4th moult 17th May.

After 4th moult.—Stage V: Length, at rest, 15.6 mm. Head, 2nd and 13th segments, light green, rest of body yellowish green. Warts and stripes as before, white. Setæ pale yellowish, subspiracular fold yellowish white, feet and claspers light green.

On 22nd nine out of fourteen in one jar were found to have passed the 5th moult, and the appearance of the larva is now entirely changed.

After 5th moult.—Stage VI: Length, at rest, 24 mm.; in motion, 28 mm.

Head pale greenish horn colour mottled with blackish green. Body

greenish gray, mottled on part above the subspiracular fold with velvety black. Top of the second segment almost solidly black, with a thin pale horn colour dorsal line, the warts very small. and similar in colour to dorsal line. This black patch is bordered on the sides by a whitish line, and below is a clear greenish wedge-shape space, wider anteriorly; below this it is mottled in black to the subspiracular band. Dorsal stripe from 3rd segment to 13th yellow, shaded with orange. Warts distinct, white like glazed porcelain. Setæ rather weak, pale in colour. On 8th to 11th segments there are two small white dots like warts in advance of wart i., at about same distance from i. as ii. is. These spots are a little further from the dorsal line than i., but not quite as far as ii. Subdorsal stripe broken up into a line of spots, subspiracular fold broad, cream colour; just above this a black band of varying width, widest at the spiracles, which show upon it as white ovals; between this and the subdorsal stripe there is a series of white dots.

The black mottling tends to be grouped about the warts and other white dots.

The top of the 12th segment is slightly swollen. Below the subspiracular fold the body is pale green with only a powdering of black atoms about the warts v. and vi.

Feet and claspers pale green.

On 23rd May I noticed that there were only 13 larvæ in the jar where there had been 14, and it is possible that one had been eaten, though they had never been short of food. In the other jar cannibalism, which is a characteristic of this group, had evidently been practised, as evidenced by the remaining anal extremity of a larva which had apparently been devoured when in process of moulting.

I therefore separated them into four jars so that they should have more room. One larva was of a much grayer tone than the average, being wanting in the greenish shade. The larvæ were mature about the end of May, the colour as usual changing just before the pupation, the greenish shade of the upper area giving place to a pinkish tinge.

The length of the mature larva is 31–32 mm. The larva enters the ground and makes a close cocoon of grayish silk and pellets of earth. The pupa is of the usual noctuid type. The moths began to appear about the 29th July, and continued to emerge for a week or ten days. This is very much earlier than they would have emerged had they been subjected to the vicissitudes of their natural life out of doors.

NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

The following species, with a few exceptions, were taken by Mr. E. P. Van Duzee and the author while on a very interesting and successful trip through southern and western Colorado during the latter part of July, 1900. These species are all strictly south-western in distribution as far as known, and most of them were found feeding on one or another of the peculiar plants of that region. While collecting in the valley of the Grand River, a number of species of Homoptera were taken, hitherto only known from the Californian region, and it is very probable that in turn several of these species, which were taken along with them, will, eventually, be found in California.

HECALUS BRACTEATUS, n. sp.

Resembling *brunneus*, the elytra shorter in the female, longer in the male. Head longer and thinner. Female, pale yellow. Male, milk-white with fuscous lines. Length, ♀ 7 mm., ♂ 5 mm. Width, ♀ 1.5 mm., ♂ 1.25 mm.

Female.—Vertex long, with a foliaceous margin, disc transversely convex, the lateral margins but slightly narrowed for half the length, then forming a parabolic curve. Length and width in front of eyes about equal, two and one-fourth times the length of the pronotum. Elytra brachypterous, covering the first abdominal segment, as long as the vertex, their apices rounding. Venation reduced, a broad margin outside of the first section, which is once forked, no apical and rarely more than one anteapical cell present.

Male.—Vertex roundingly triangular, its basal width one-third greater than its length, slightly longer than pronotum, margin not foliaceous. Elytra long and narrow, much longer than abdomen, venation distinct, somewhat irregular, usually the second cross nervure present, forming three anteapical cells, of which the second is much the longer.

Colour: female pale yellow or straw colour, the elytra with a few fuscous dots next the nervures; abdomen with a pair of olive stripes on each side, these stripes margined with dotted fuscous lines, a similar median line. Sometimes the olive stripes disappear, leaving the abdomen with nine dotted fuscous lines. Male milky white, sometimes with five olive stripes, dotted with fuscous, on vertex and pronotum. Elytra

with the milk-white nervures margined with fuscous dots. Upper half of the face fuscous.

Genitalia : ultimate ventral segment of the female as long as the penultimate, the posterior margin roundingly emarginate, with a broad blunt tooth. Male, valve triangular, plates triangular, the margins slightly concave, fringed with stout spines ; plates about three times the length of the valve.

Described from numerous specimens from Rocky Ford, Colo. This species is apparently intermediate in structure between this genus and *Parabolocratus*. The females are all brachypterous and have the elongate head of a *Hecalus*, while the males are long-winged and have the short vertex of *Parabolocratus*.

ATHYSANUS SYMPHORICARPÆ, n. sp.

Form and size of *instabilis*, lighter coloured, resembling *striatulus*, but larger and lighter testaceous. Length, 4.5 mm.; width, 1 mm.

Vertex twice wider than long, half longer at apex than against eye, rounding to the broad almost parallel margined front, clypeus much narrower than apex of front, parallel margined. Elytra stout, longer than body as in *instabilis*, the central anteapical cell long, narrowed in the middle, more than half its length beyond the apex of clavus.

Colour : vertex and face yellowish testaceous, lines on front and irrorations on vertex fusco-testaceous. Pronotum and scutellum paler, with a slightly olive tinge. Elytra pale brownish or olive testaceous, subhyaline, the nervures light. Legs and all below pale orange testaceous.

Genitalia : ultimate ventral segment of the female little longer than the penultimate, the lateral margins narrowing, the lateral angles a little produced, triangular, between these the posterior margin is slightly rounding, shining black. One specimen has an acutely angular notch either side the middle, one-third the distance to the margin, leaving a broad central tooth ; one has only one notch ; and two, probably not having copulated, have none.

Described from four females from Ridgeway, Colo.

ATHYSANUS VARUS, n. sp.

Form and colour of *alpinus* and *extrusus*, but with a narrower body and longer elytra. Male darker, resembling *plutonius* female. Length, ♀ 5 mm., ♂ 4.25 mm. Width, ♀ 1.5 mm., ♂ a little over 1 mm.

Vertex roundingly triangular, twice wider than long, two-thirds the length of the pronotum, disc convex, rounding to front, apex bluntly conical; front broad and flat, width between antennæ a little less than three-fourth its length. Elytra long, the outer margins almost parallel, their apices very broadly rounding. Venation strong, often accessory cross nervures along clavus and between sectors of corium; central anteapical cell very long, the posterior end angularly enlarged.

Colour: ground colour a dirty straw-yellow; vertex with a transverse band just back of the ocelli, the ends of which do not reach the eye, but curve forward to the front; another interrupted band half way between this and the posterior margin and two dashes curving away from the apex and paralleling the other bands, black. Elytra with the nervures white, the cells mostly filled with dark fuscous, omitting a transverse, hyaline, band across the juncture of apical and anteapical cells, a large milk-white patch on the cross nervures between the sectors, a smaller one at the apex of each claval nervure and sometimes another next to the claval suture. Face, dirty yellow arcs on front, especially on upper half; sutures, spots around the antennal sockets and the disc of the clypeus, fuscous. Male much darker than female, lower part of face and below black.

Genitalia: ultimate ventral segment of the female one-half longer than penultimate, posterior margin nearly truncate, the median third roundingly produced; usually the segment is curved over the ovipositor so that it appears emarginate, with a quite pronounced median lobe; male valve less than half as long as its breadth at base, the apex rounding; plates no wider than the valve, slightly concavely triangular, the apex acute, two and one-half times the length of the valve, clothed with stout white spines.

Described from ten females and one male from Fort Collins, Colo.

Readily distinguished from any other American species by the genitalia and venation. There is a group of about six European species that possess the same milk-white elytral markings, of which *distinguendus* and *Schenkii* are similar in form, but none of them in venation and genital characters.

THAMNOTETTIX GRAECULA, n. sp.

Form of *flavocapitata* nearly, but stouter; as large as *Coquilletti*, which it somewhat resembles in colour. Length, ♀ 5.5 mm., ♂ 5 mm.

Vertex roundingly angular, the apex conical, scarcely two-thirds as long as its breadth at base, half longer than against eye; disc convex, rounding to the front except at apex; front broad, rather flat; clypeus broadest just before the rounding apex. Pronotum a little over half longer than vertex; elytra rather stout. Venation peculiar, resembling *longula*, except that the outer anteapical cell is pointed and petiolate anteriorly and the outer fork of first sector is very faint. Male smaller and with a blunter vertex.

Colour: pale yellowish olive; the female has two large spots within the basal angle and two smaller ones on the disc of the scutellum and the cross nervures between the sectors brown. Elytra with slight reddish cast. The males have no marking on scutellum, the elytra are distinctly embrowned, especially along the claval and apical areas. In both sexes there are a number of oval subhyaline areas. In the males there are three approximate pairs along the sutural margin.

Genitalia: ultimate ventral segment of female half longer than penultimate, the lateral angle rounding, the posterior margin triangularly emarginate from the lateral angles half way to the base; from the bottom arises a strap-shaped tooth equalling the lateral angles; male valve broadly evenly rounding. The plates, concavely, triangularly acuminate, about twice the length of the valve.

Described from one female and three males from Rifle, Durango and Colorado Springs, Colo.

SCAPHOIDEUS BLANDUS, n. sp.

Form and general appearance of *jucundus*, smaller and paler, lacking the reddish tinge of that species. Costal margin of elytra with numerous regular cells. Length, 5 mm.; width, 1.10 mm.

Vertex right-angled back to the eyes, which round off, not quite as long as its basal width, disc flat, margins straight, vertex and face forming an acute angle; front, margins straight, clypeus very slightly broadened below. Pronotum as long as vertex, more than half of its length within the curve of the vertex. Elytra, claval veins but slightly curved apically, usually a cross nervure from outer one to suture and often several irregular ones between the veins, outer anteapical cell usually with one cross nervure to the costa, sometimes several, costal margin with numerous, indistinct, almost equidistant nervures which are perpendicular to the margin.

Colour: almost uniform dull yellow, the anterior margin of vertex pale, faintly margined with brown. Elytra with oval light spots, which are milky on clavus and subhyaline white on corium; the three pairs along the sutural margin are very regular. Below pale yellow.

Genitalia: ultimate ventral segment of female twice wider than long, posterior margin rounding, variably trisinuate either side of a narrow median incision; the inner pair of lobes usually largest, lateral angles rounding, disc with a dark spot, pygofers short, strongly inflated in the middle. Male valve small, bluntly triangular; plates rather broad, the basal half rounding, apical half triangularly narrowing to the blunt tips, two and one-half times longer than valve, the flat lateral margins separated from the convex disc by a dark line.

Described from numerous specimens from Rifle, Ridgway, Dolores and Durango, Colo. The quadrangular cells along the costa will readily separate this from any described form.

SCAPHOIDEUS FUMIDUS, n. sp.

Resembling *blandus* in form and size. Colour rich testaceous brown, the margins of vertex and pronotum and apex of elytra white. Length, 5 mm.; width, 1.5 mm.

Vertex right-angled, slightly shorter than its basal width, lateral margins slightly rounding, disc flat or slightly transversely depressed on the middle; outline of face as seen from the side straight, front rapidly widening above antennal pits, regularly narrowing below; clypeus short, constricted in the middle, genæ broadly margining the loræ below. Pronotum slightly longer than vertex. Elytra rather long and narrow behind; outer claval vein nearly straight, venation obscured by the deep colour, except in the apical cells, nodal vein arising from beyond the middle of the outer anteapical cell.

Colour: rich testaceous brown, vertex lighter, the lateral margins of vertex and pronotum and the costal margin of elytra at base creamy white, the apex of corium from just beyond the clavus and including all the apical cells and the apices of the two outer anteapical cells, subhyaline white. Sometimes a few oval white spots in the testaceous portion of elytra. Face and below pale creamy yellow.

Genitalia: ultimate ventral segment of female with a broad, triangular, median notch, either side of which there is a broad rounding lobe which slopes away to a small triangular lobe next the lateral angle;

male valve small, not as long as the ultimate segment, roundingly triangular; plates narrow, long, triangular, their apices acute.

Described from ten specimens from Rifle, Dolores and Durango, Colo. The white margins anteriorly and the sharply defined tip to the elytra against the rich ground colour render this an easily recognized species. The general shape and colour suggest the genus *Platymetopius*, but the shorter vertex and the face characters place it with *Scaphoideus*. Such species as this weaken generic characters and at the same time help us in that they show affinities.

PHLEPSIUS VANDUZEI, n. sp.

Form and general appearance of *cinereus*, but much larger; stouter built than even *nebulosus*; grayish cinereous, with a trilobate commissural line. Length, 8 mm.; width, 2.75 mm.

Vertex very bluntly conical, one-fourth longer on middle than against eye, three-fifths the length of the pronotum, no visible line between it and front; front not quite as long as its basal width, the apex one-third the width at base; clypeus long, wedge-shaped, broadest below; pronotum two and one-third times wider than long. Elytra broad, longer than the body, compressed before the flaring apex; claval veins sometimes tied across.

Colour: dirty white, sometimes a pale yellow wash on vertex and pronotum. Vertex with a distinct round black spot on the middle of either side at the base, a few irregular dark vermiculations anteriorly, omitting a broad median line which extends down the front; numerous short arcs on front, a spot on clypeus, a pair on loræ, another pair just under eyes, fuscous. Pronotum and scutellum with very faint markings, elytral veins yellow and fuscous; between them the membrane is very finely, sparsely, and somewhat irregularly vermiculate, omitting a broad commissural line, which is divided into three lobes by the apices of the claval nerves. The outer apical and two costal veins often very much infuscated, the spaces between clear.

Genitalia: ultimate ventral segment of the female appearing only as a narrow strip along the pleura on either side; in its place is a thin membrane shaped almost like the segment in *apertus*, with its rectangular median excavation, and showing beyond its posterior margin the rounded apices of the plates, near the middle line, and the rounding lobes of a second membrane near the lateral angles; male valve triangular, the apex bluntly roundingly produced; plates broad at base, roundingly triangular,

their apices produced, compressed, slightly divergent; disc, convex, inflated, a few appressed hairs along the margin; plates equalling the pygofers, nearly five times the length of the valve.

Described from a pair taken at Rifle, Colo., by Mr. E. P. Van Duzee, and two females taken at Grand Junction the next day by the author. This large species is strikingly distinct in form, colour and genitalia, and it gives me great pleasure to name it after the man who has in the past so carefully worked out this genus for us, and whose energy and "Kansas umbrella" taken together did so much to make this mountain trip both pleasurable and profitable to the author.

PHLEPSIUS EXTREMUS, n. sp.

Very small, oval, depressed, with a flat, thick margined vertex; resembling *decorus* and *areolatus* in general appearance, but much smaller. Smaller than *ovatus*, head as wide as the pronotum. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex flat, over three-fourths the length of the pronotum, over half longer on middle than at eye, not quite twice wider than long, the anterior margin thick, angle with front acute; front broad, nearly flat, longer than wide. Elytra short, oval, claval veins distinct.

Colour: milky white, heavily irrorate with dark fuscous so that the general colour is dark without the reddish or brownish tinge so common in this genus; vertex very heavily irrorate, omitting a narrow margin and median line. Pronotum with large olive brown spots along the anterior margin as in *decorus* and *areolatus*. Elytra with numerous supernumerary veins and reticulations, irrorations almost obsolete except in a few dark spots around the apex and along the costa, one or two near the apex of clavus and two very distinct ones between the sectors of the corium. Front very heavily irrorate with brownish fuscous, rest of face and legs lighter.

Genitalia: ultimate ventral segment of the female twice the length of the penultimate, the lateral angles broadly, roundingly produced, between these the margin is roundingly emarginate with minute angular teeth at the bottom. In the natural position of the segment it appears to be angularly emarginate almost from the lateral margins; male valve very small, broad and short, about one-fourth the length of the ultimate segment; plates triangular, their apices hardly acute, a little longer than the ultimate segment.

Described from two males and two females, three from Rifle and one

from Durango, Colo. One Rifle specimen from Mr. Van Duzee. This is as short as *albidus*, but much broader, and is quite distinct structurally from any other species with a flat vertex and a broad head.

PHLEPSIUS DENUDATUS, n. sp.

Resembling *ovatus*, but broader and shorter. Even lighter coloured than *albidus*. Head broader than thorax. Form stout. Length, 4 mm.; width, 2 mm.

Vertex blunt, rounding, twice wider than long; front broad, about one-fifth longer than wide, clypeus enlarged at apex. Pronotum very short, but one-third longer than vertex, lateral margin scarcely apparent. Elytra short, broad, flaring behind, giving the insect a square-set appearance. Venation very indistinct, somewhat variable.

Colour: milky white, very sparsely spotted and irrorate with fuscous. Vertex with a pair of round spots just inside the eyes; within and back of these a pair of oblique dashes, fuscous. Pronotum with a pair of fuscous spots in a line with the inner margin of the eye on either side, sometimes a row of fuscous markings inside of these. Scutellum with a pair of triangular spots within the basal angles and a smaller pair of round ones on the disc. Elytra with three pairs of equidistant approximate spots along the suture, the middle pair the largest, and a number of spots along the costa, black. Sometimes these are absent except the large pair on the suture, and a spot opposite the anteapical cells on either costa. Veins pale yellow, indistinct. Face and all below dirty white.

Genitalia: ultimate ventral segment of the female about twice as long as the penultimate, the lateral angles feebly, angularly produced, the margin between them very slightly rounding, with a small semicircular median emargination; male valve small, triangular; plates broad, triangular, as long as the ultimate segment.

Described from numerous specimens from Grand Junction, Colo. (V. D. and the author.) This is another of the "white" Phlepsids, which seems to be strictly south-western in distribution. In structure it resembles *Vanduzei*, but in size and colour it is very different.

(To be continued.)

I desire to acknowledge the Society's indebtedness for a perfect pair of Plusia aeroides, from Mr. C. H. Young, Hurdman's Bridge, through Dr. Fletcher. A very rare species in this district.

J. ALSTON MOFFAT, Curator.

REVISION OF THE GENUS CATOCALA.

BY G. H. FRENCH, CARBONDALE, ILL.

On page 191, Vol. XXXII., of the CANADIAN ENTOMOLOGIST (1900), Dr. Grote describes a new species of Catocala from Texas, *C. moderna*, related to *C. viduata*. If we place this as No. 7 in our list of the former article, and push the rest one number forward, it will bring *C. relicta* No. 21 instead of No. 20. Following this with the "red wing" species, I would arrange this group as follows:

22. Cara, Guenee.
 var. Sylvia, Hy. Edw.
 var. Carissima, Hulst.
23. Amatrix, Hubner.
 var. Nurus, Walker.
24. Concumbens, Walker.
 var. Diana, Hy. Edw.
 var. Hillii, Grote.
25. Californica, Edw.
 var. Perdita, Hy. Edw.
 var. Cleopatra, Hy. Edw.
26. Hippolyta, Hy. Edw.
27. Arizonæ, Grote.
28. Luciana, Hy. Edw.
 Nebraskæ, Dodge.
 var. Somnus, Dodge.
29. Marmorata, Edw.
30. Babayaga, Strecker.
31. Aspasia, Strecker.
 var. Sara, French.
32. Junctura, Walker.
 var. Walshii, Edw.
33. Unijuga, Walker.
34. Beaniana, Grote.
35. Augusta, Hy. Edw.
36. Rosalinda, Hy. Edw.
37. Pura, Hulst.
38. Semirelicta, Grote.
39. Meskei, Grote.
40. Stretchii, Behr.
41. Portia, Hy. Edw.
42. Mariana, Hy. Edw.
 var. Francesca, Hy. Edw.
43. Jessica, Hy. Edw.
44. Grotiana, Hy. Edw.
45. Hermia, Hy. Edw.
46. Cassandra, Hy. Edw.
47. Briseis, Edw.
48. Faustina, Strecker.
 var. Zilla, Strecker.
 var. Verecunda, Hulst.
 var. Allusa, Hulst.
49. Irene, Behr.
 var. Virgilia, Hy. Edw.
 var. Volumnia, Hy. Edw.
 var. Valeria, Hy. Edw.
50. Parta, Guenée.
 var. Perplexa, Strecker.
 var. Petulans, Hulst.
51. Coccinata, Grote.
 Sinuosa, Grote.
 var. Circe, Strecker.
52. Aholibah, Strecker.
53. Violenta, Hy. Edw.
54. Verilliana, Grote.
 var. Ophelia, Hy. Edw.
 var. Votiva, Hulst.
55. Ultronia, Hubner.
 var. Celia, Hy. Edw.
 var. Mopsa, Hy. Edw.
 var. Adriana, Hy. Edw.
 var. Herodias, Strecker.
56. Ilia, Cramer.
 var. Zoe, Behr.
 var. Uxor, Guenée.
 var. Osculata, Hulst.
57. Innubens, Guenée.
 var. Flavidalis, Grote.
 var. Hinda, French.
 var. Scintillans, Grote.

The three forms, *Babayaga*, *Aspasia* and *Walshii*, have been more or less confused. While at a casual glance they are very close, still I have no trouble in separating them. The first I have seen from Texas and Arizona. The fore wings have a brownish velvety appearance, the s. t. line not lighter than inside the t. p. line, the t. p. and t. a. lines dark brown with a mesian transverse and s. t. brown shade. The mesian band of the hind wings is very narrow, only slightly expanded in the middle, abruptly bent at the posterior and not reaching the internal margin.

Aspasia has the ground colour of a slight bluish tinge, the lines of a deeper brown, almost black, the mesian and s. t. shades more distinct brown, the s. t. line almost or quite concolorous with the ground colour. The mesian band of the hind wings is from a quarter to a third wider than in *Babayaga*, and often nearly reaches the internal margin by a shade.

In *Walshii* the ground colour of the fore wings is much as in *Aspasia*, but the s. t. line is white or whitish and the shades are less brown, and the m esian band of the hind wings is nearly twice as wide as in *Babayaga*.

I have seen *Babayaga* from Texas and Arizona; *Aspasia* from Arizona and Colorado; *Walshii* from Arkansas, Missouri and Illinois; and what may be *Junctura* from Arkansas. I have not before me Walker's description, and hence do not know the locality he gives for the specimen he described. If I know the genuine *Junctura* it has more or less white through the middle of the fore wings, as Grote says in one of his descriptions, somewhat simulating *Unijuga*, with the mesian band of the hind wings wider than in either of the first three forms. I have seen such specimens from the East, and one or two from Arkansas in the collection of Mr. T. C. Poling, of Quincy, Ill., approximate the eastern forms. On the strength of this I have put *Walshii* as a variety of *Junctura*.

As to the specific status of these forms I have not much to say. I have taken *Walshii* here in Southern Illinois for more than 20 years, and have never found one intergrading toward what I have called *Junctura*, and hence have not shared Mr. Grote's idea that it was a synonym of *Junctura*, and only place it as a variety for the reason given above. Nor have I seen any intergrading toward *Aspasia* or *Babayaga*. It is possible that these four forms are but one species, but it seems to me better to let them stand till by breeding they are proven to be one.

In another species, *Stretchii*, I found by breeding that there was considerable variation in the colour of the fore wings, but the mesian band

of the hind wings and the main markings of the fore wings were constant. Hence I separate this without hesitation from all other forms.

It is commonly conceded now, I think, that *Nebraskæ*, Dodge, is a synonym of *Luciana*, Hy. Edw. I have not seen *Portia*, *Jessica* and *Cassandra*, and place them where they have been placed, as I have only descriptions of these species. From my own observation I should be inclined to separate *Circe* from *Coccinata*, as I take only the first form here, but the size given in the descriptions and what I have seen in other collections lead me to think that they are but forms of one species.

A NEW CANADIAN TINEID.

BY AUGUST BUSCK, WASHINGTON, D. C.

Anacampsis lupinella, n. sp.

Antennæ bronzy black with white annulations, slightly serrate, especially towards the tip.

Labial palpi long, smooth, recurved; second joint somewhat thickened, with appressed scales, dark ochreous brown; terminal joint longer than second, acicular, dark brownish, with tip black.

Maxillary palpi obsolete. *Tongue* stout, scaled.

Eyes [in the dry specimen] dark brick red.

Face light brown, with dark purple reflexions.

Head and *thorax* concolorous with fore wings, purplish black, with a satin lustre and with numerous evenly distributed bluish white scales, only visible under a lens.

Three varieties are before me.

Fore wings in some specimens without any markings; in others they have a distinct whitish yellow spot at the beginning of the costal cilia and another similar dorsal spot opposite.

In still other specimens these spots are extended downwards and upwards relatively and meet each other, forming a narrow transverse fascia.

In the two former varieties the fore wings are otherwise uniformly coloured, but in the last moth the outer half of the wing is suffused with irregular longitudinal streaks of light brown.

Presumably all gradations of these types exist.

Under side of fore wing uniformly bluish black, without trace of the fascia or spots.

Hind wings a little broader than fore wings, termen not sinuate, black, with strong purple reflexions.

Venation typical: Fore wings: 12 veins, 7 and 8 stalked, the others separate. Hind wings: 8 veins, 3 and 4 connate, 6 and 7 connate.

Entire body and legs purplish black.

Alar expanse 14 mm.

Habitat.—High Park, Toronto, Canada.

U. S. National Museum, type No. 5351.

Described from three perfect female specimens, reared from *Lupinus perennis* and presented to the National Museum by Dr. J. Fletcher.

The insect is in several respects an interesting one. It belongs to that group of *Anacampsis*, Curtis [*Tachyptilia*, Hein., *Meyrick*], which in coloration suggests strongly the *tænionella* group of the genus *Aproærema*, Durrant [*Anacampsis*, Meyrick].

It is nearest *Anacampsis* (Gelechia) *agrimoniella*, Clemens, and has not only the pattern but the leguminous food plant of *Aproærema*, while having the wing form and venation of *Anacampsis*; indicating in connection with the other species in this group the correlation of the two genera.

Its general habitus suggests very much the genus *Trichotaphe*, Clemens, to which genus I took it to belong, before examining closely the venation.

The insect is one proof of the close relationship between *Anacampsis* and *Trichotaphe*, which in their nearest related forms only differ in the single point: veins 2 and 3 in fore wing being stalked in Trichotaphe, while they are separate in Anacampsis.

Anacampsis tristrigella, Walsingham, described as *Gelechia*, and *Anacampsis levipedella*, Clemens, described as *Strobisia*, belong in this immediate group.

The following description of the full-grown larva is by Dr. James Fletcher, Ottawa:

Larva.—Shape as in many other Tineids, almost cylindrical; head and 2nd segment slightly smaller than rest of body; segments 3 to 5 very little smaller than segments 6 to 12. Length 13 mm., extended 15 mm. Width, segments 6 to 12, 2 mm. wide; segment 2, 1.40 mm., segments 3, 4 and 5, 1.60 mm. Head 1 mm. wide, flattened and rather shorter than wide; horizontal, slightly oblique, shining, bearing a few slender hairs; deeply indented at apex, testaceous, darkened along posterior margin and bearing a black blotch at lower posterior angle of each cheek; ocellar field black; length .90 mm. Thoracic shield large, conspicuous, concolorous with head; width 1.30, depth .50 mm; almost straight in front,

rounded posteriorly. One-third of lower margin edged with black and terminating with a black point at lower anterior angle ; posterior margin swollen and bearing on each side of median line 3 small black piliferous tubercles. There are also 3 others on front margin. Tubercles of body black, bearing slender fawn-coloured hairs, normally placed, consisting of 3 dorsal, 3 substigmatal and 1 ventral series. No. i. anterior, and subdorsal, half the size of ii. and iii.; No. ii. posterior, and supralateral ; No. iii. median, immediately above the minute black spiracles, slightly larger than ii.; on segments 7 to end enclosing the spiracles in their lower margins ; No. iv. twice its width from spiracles and immediately below them ; No. v. below and in a line with No. ii.; the tubercles of series No. vi. form a line running from base of thoracic feet to base of anal prolegs ; the tubercles of this series are more than twice longer than high, being merely short black chitinous dashes bearing 2 or 3 bristles, except on segments 5, 6, 11, 12 and 13, where they are dots. Substigmatal series, tubercles iv., v., vi., are all of the same size as ii., larger than i., smaller than iii. Medio-ventral series of very small tubercles, one on each side of every segment, beneath. On segment 2 a large black oval tubercle (No. v.), beneath thoracic shield and anterior to the spiracle, and a tubercle at base of thoracic foot (No. vi.). On segments 3 and 4, tubercle No. i. is wanting, and as usual Nos. ii., iii. and v. are arranged in a curved line across the segments ; No. v. anterior to the other two ; vi. is at base of thoracic foot, and iv. immediately above it, but higher up than v.

General colour of larva dark olive green above, paler below, dorsal vessel showing as a dark stripe. Thoracic feet testaceous, blackened at tips, with a narrow chitinous black fold in front and another behind at the base of each. Prolegs concolorous with body ; claspers rusty.

Cocoon, slight, among the leaves. Pupa chestnut brown, length 6.50 mm. by 1.75 mm. at widest part. Thorax and abdomen bearing a few slender bristles, which are most numerous towards the cremastral end. Cremastral hooks long and slender. Whole body covered with a very short fulvous velvety pile.

These larvæ were found in considerable numbers among leaves of *Lupinus perennis* kindly sent from High Park, Toronto, by Mr. Allan Kinghorn. Each larva made a tent by tying two or three of the leaflets loosely together. They were almost full-grown when received, and the first pupated on the 10th of June. Pupal period about eight days. Eight moths were reared, all females. There was considerable variation as to markings, the transverse fascia being obliterated in some specimens, but more or less apparent in most.

CYPHODERRIS MONSTROSA.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

From time to time during the last two or three years, Dr. James Fletcher has sent me specimens of a curious Locustarian taken at Banff, Alberta, by Mr. N. B. Sanson, curator of the Government museum in the National Park at that place. The specimens were all wingless and apparently immature females, but quite unlike anything known from that region. A study of their structure showed that they belonged to the Stenopelmatini and were most nearly allied to the genus Cyphoderris. Now, Cyphoderris, though described by Uhler thirty-six years ago, is a rare creature and was on record from only two localities, Oregon and Wind River, Wyo., and only males had hitherto been taken. The probability that these immature and wingless females belonged with the winged males appeared to me, however, so great that in my recent catalogue of North American Orthoptera I recorded the species given in the title above as found in Alberta.

Nevertheless, I had misgivings and asked Dr. Fletcher to obtain mature specimens to make sure. By his urgency, Mr. Sanson has forwarded separately this last autumn two mature females *alive*, the first of which Mr. Fletcher sent to me. These were in no respect different from the immature specimens except in size and in slight traces of wing-pads beneath the pronotal shield; while in the appearance of the pronotum they differed so greatly from the male of Cyphoderris that I was as much at a loss as ever; for the male Cyphoderris has the posterior half of the pronotum so hunched and enlarged as to be almost a half broader posteriorly than anteriorly; this is to give room for the coarse and bellied tegmina, which it overhangs, which are considerably longer than the pronotum, and nearly the whole of whose dorsal surface is made up of a coarse stridulating organ. But the females sent had a pronotum of nearly uniform diameter and practically no wings. Only by securing a male from the same region or females from Oregon or Wyoming could the question really be decided whether these represented closely-related genera or the same or nearly-allied species. The matter has just been definitely settled by the receipt of a male from Banff, kindly sent by Mr. Sanson from his collection, which cannot be separated from the Oregon types in my possession. Mr. Sanson responded generously to the

demands upon him; he obtained his specimens under logs and stones where he had placed old bones as a bait. They appear to be scarce, and he has so far secured but one male.

The occurrence of such a form so far north is of particular interest, for Cyphoderris belongs to a group of Anostostomata (a subdivision of Stenopelmatini) which is purely American, but mainly tropical, its northernmost allies being found in Mexico. Moreover, the Old World species and genera of Anostostomata are from the southern hemisphere exclusively.

Both Mr. Fletcher and I kept our females alive for nearly a month, feeding them chiefly on apples, of which they partook rather sparingly. They were very sluggish, as seemed fit for such heavy-bodied creatures, and could scarcely jump at all, not above half an inch at a time, and were more active by night than by day. Whether eggs are laid in the autumn or spring is uncertain; the former would seem probable from their dying in captivity before November, the latter from the fact that when captured in September the thermometer stood at 19° F. I gave my specimen no water, but Mr. Fletcher gave his some from a brush, which she drank, but, he writes me, "if I push the brush too assiduously she turns over on her back and bites and kicks savagely and then lies perfectly still." After death the abdomen contracts greatly.

Taking advantage of possessing a living specimen, I took notes of the colouring, etc., from which the following description of the female is taken:

Head above the antennæ bronze black, longitudinally marked with pallid luteous; genæ and face below the antennae pale lilac, excepting the clypeus and labrum, which are pale lemon yellow, the whole marked with blackish; palpi pallid, feebly infuscated, especially the maxillary pair, in stripes and apical marginings, the extreme apex of apical joint pallid; basal joint of antennæ pallid, with broad basal and narrow subapical fuscous annuli, the remaining joints bronze black; eyes castaneous.

Pronotum subcylindrical, subequal, very feebly constricted just in advance of the middle, dull luteous with a nacreous sheen, the posterior edge and lower margins of the lateral lobes flavous or flavescent, the whole heavily and massively marked, especially in the constricted region, with very dark glistening bronze green, the whole surface, whether dark

or light, sprinkled very sparsely and very inconspicuously with luteous dots. Sternal parts of thorax luteous, more or less infuscated. Tegmina reduced to minute membranous testaceous pads, concealed beneath the pronotum. Coxæ and trochanters blackish fuscous; femora luteo-testaceous, the whole apex and a broad longitudinal median band on the outer side subpiceous; tibiæ pallid luteous, with a piceous stripe following the upper lateral spinigerous margins, heavier in basal than in apical half; the fore pair with one spine above on inner margin, besides an apical one, none on the outer margin, below with two or three spines on each side, besides the apical one; the middle pair with no spines below, two or three on either side above, besides the apical one; and the hind pair with no spines below and six or seven on either side above, besides the apical one; the spines pallid or luteous tipped with black, excepting the apical spines, which are almost wholly fuscous; tarsi very pale red beneath, pallid above, edged apically with fuscous.

Abdomen very plump, deeper than broad, having above the same colours as the pronotum, the luteous nacre forming the base, and the bronze green, somewhat embrowned, confined to the apical margins of the segments in an irregular edging; sides of abdomen between the dorsal and ventral scutes pale brown, sparsely sprinkled with pallid dots, the spiracles glistening bronze.

Length of body, 21 mm.; pronotum, 8 mm.; breadth of same, 7 mm.; length of antennæ, 25 mm.; hind femora, 11 mm.; hind tibiæ, 10.5 mm.; hind tarsi, 7 mm.

[Mr. Sanson states that these insects are by no means common at Banff. The first specimen he acquired was found in the basement of the Canadian Pacific Hotel, by Miss Adams, of Winnipeg; Mr. W. C. McCalla, of St. Catharines, Ont., took two immature specimens among the fir boughs used as a bed in his camp. One specimen was given to Dr. White, of Banff, by Mr. George Paris, of the same place. Mr. Sanson caught two mature females, one by placing some biscuits and brown sugar under a sheet of botanical drying felt near one of the summer residences off Tunnel Mountain Rd., near the place where the perfect male referred to above was taken; the second was found under a log where a bone had been placed as a bait; and the last specimen found was brought to him by a member of a camping party, who had it for a few days and brought it in alive. In all, seven specimens have been secured.—ED.]

NOTES ON SOME ONTARIO ACRIDIIDÆ.—PART IV.

BY E. M. WALKER, TORONTO.

(Continued from Vol. XXXI., page 36.)

16a Spharagemon collare, Scudd., race Wyomingianum, Thomas.

Oedipoda Wyomingianum, Thom. Ann. Rep. U. S. Geol. Surv. Terr., V. 462 (1872).

Spharagemon Wyomingianum, Scudd. Proc. Boston Soc. Nat. Hist., XVII., 470 (1875).

Spharagemon oculatum. Morse. Proc. Boston Soc. Nat. Hist., XXVI., 232 (1894).

Spharagemon collare, race *Wyomingianum*, Morse. Psyche, VII., 298 (1895).

In September, 1899, I found this species fairly plentiful on sand dunes, in Rondeau Provincial Park, Kent Co., on the shore of Lake Erie. The sand dunes occupy a considerable area there, and in some places near the lake shore are thinly wooded with red cedar *(Juniperus virginianus)*. It is here that I found this locust in the largest numbers, though they were also to be found further away from the shore in open places in oak woods; only, however, where the soil was sandy. In another part of the Park, where the trees were mostly pines, *S. bolli*, Scudd. was common, but I never found the two species together. In the juniper groves near the beach, *S. Wyomingianum* was in company with *Trimerotropis maritima* which occurred in great numbers, and was found also, and still more abundantly, on the open beach, where *S. Wyomingianum* did not venture.

The hind tibiæ of my specimens vary from pale yellow to orange, none being decidedly red. They are dated Sept. 14 and 15, 1899.

This is the first notice of this species in Ontario, and of the race *Wyomingianum* in Canada. I have found the typical *collare* common from Manitoba to British Columbia.

Encoptolophus sordidus, Burm.—Until the last two or three years this species was quite rare in Toronto, which was about its northern limit in that part of Ontario. In the fall of 1897 I saw quite a number in some of the dry, sandy hillsides in High Park, and in 1898 they were much more numerous, and were even seen about the city, in open grassy places. This summer they were common everywhere, their crackling stridulation being heard in almost every field. They have now extended to Lake Simcoe, if not further, for I found them in small numbers, this summer, at De Grassi Point. The species seems to be spreading northward.

21a. Podisma glacialis, Scudder.

Pezotettix glacialis, Scudd. Boston Journ. Nat. Hist., VII., 630–631 (1863).

Pezotettix borealis, Glov. (nec. Scudd.). Ill. N. A. Ent., Orth. (1872).

Podisma glacialis, Scudd. Rev. Melanopli, p. 98 (1897).

While collecting at North Bay, Lake Nipissing, on Sept. 12, 1900, I took 10 ♂s and 5 ♀s of this insect. They differ slightly from the typical *glacialis* of the White Mountains, approaching *P. variegata* to a slight degree in several points. Having compared them with two pairs of typical *glacialis* from New England, and noticing these peculiarities, I sent a few specimens to Mr. Scudder, who says that they are "without doubt *glacialis*, though varying slightly towards *variegata*, especially in the (feebly) banded hind femora." He also notes that "the cerci of the ♂ are more smoothly rounded at the apex and the furcula shorter than in typical *glacialis*." As compared with my New England specimens, they also differ in having in every case distinctly longer antennæ and hind femora, and in the more prominent eyes; in all of these characters approaching *variegata*.

In the White Mountains Mr. Scudder has found this species on the dwarf birch (*Betula nana*), while Mr. Morse has found it most common in the various species of *Vaccinium* characteristic of mountain tops, and on dwarf cornel. Most of my specimens were found on red raspberry bushes, like *P. variegata*, at Lake Simcoe, but many were also seen on alders. Unlike *variegata*, they are not confined to swamps, but are also found in comparatively dry places.

I have two immature males of a *Podisma*, probably this species, collected by Mr. G. M. Stewart on the portage between Lakes Esnogami and Kabinakagami, in Northern Ontario. This portage is across the Height of Land, and is a little further north than the species has hitherto been recorded. One of the specimens is almost full-grown, and in both the hind femora are pale yellow, strongly banded with black. They are dated July 12 and 13, 1900.

26a. Melanoplus extremus, Walk.

Caloptenus extremus, Walk. Cat. Derm. Salt. Brit. Mus., IV., 681 (1870).

Pezotettix junius, Dodge. CAN. ENT., VIII., 9 (1876).

Caloptenus parvus, Prov. Nat. Canad., VIII., 110 (1876).

Melanoplus extremus, Caulfield. Rep. Ent. Soc. Ont., XVIII., 71 (1886).

I have a single female of the short-winged form of this grasshopper, collected by Mr. G. M. Stewart in a muskeg ten miles west of the portage between Lake Kabinakagami and the Matawishguia River.

At the same spot Mr. Stewart also took two males of *M. islandicus*, Blatchley, an adult and a nymph. These three specimens are dated Aug. 18, 1900. On the portage between Lakes Esnogami and Kabinakagami two mature females of *M. islandicus* were taken, July 15, 1900.

29a. Melanoplus bivittatus, Say.

Gryllus bivittatus, Say. Journ. Acad. Nat. Sc. Philad., IV., 308 (1825).

Caloptenus bivittatus, Uhler (pars), Say. Ent. N. A., ed LeC., II., 238 (1859).

Melanoplus bivittatus, Scudd. (pars), Hitchc. Rep. Geol. N. H., I, 376 (1874).

I took a single ♀ of this grasshopper while collecting at North Bay, on Sept. 12, 1900. This is the true *bivittatus*, not the common species with red hind tibiæ, usually so-called, which is *M. femoratus*, Burm. The hind tibiæ of my specimen are dark bluish-green above at base, gradually passing into pale greenish-yellow at apex.

Although I spent some six hours collecting at North Bay, and searched carefully for both *M. bivittatus* and *M. femoratus*, I obtained but one specimen of each, both females. I expected to find *femoratus* common, as it is abundant in Muskoka, and has been taken as far north as Hudson's Bay.

M. bivittatus is an interior and Western form, so that its occurrence in Northern Ontario is of some interest.

Melanoplus punctulatus, Uhler.—During the last two seasons I have found this insect quite plentiful locally, though I spoke of it in a former paper (CAN. ENT., XXXI, 35) as one of our rarest Acridians. Until then I had never seen the male, but in the season of 1899 I found about a dozen of them, and this season I have seen more than one hundred. I found them most numerous on dead stumps and logs, in a wood of second-growth white pine, at De Grassi Pt., Ont. They were sometimes seen on the trunks and branches of living trees, but most often on the stumps and fallen trunks of the old forest, and on the pine rails of a snake fence enclosing the wood. They were found only on the borders and more open parts of the woods, where they were to be seen upon almost every stump. I have seen ten ♀s on a single stump. It is in these dead stumps and logs that the females deposit their eggs, in which operation I have

observed them repeatedly. The female chooses a crack in the wood or an old beetle-boring of suitable size, and lowers her abdomen down this, sometimes nearly as much as an inch. Sometimes when the hole is of large size, only the head and legs of the insect can be seen above it. Unlike *Chloealtis conspersa*, the female of *M. punctulatus* apparently never bores herself unless merely to make her way through any loose rubbish that might be obstructing the hole. She generally chooses sound or only partly decayed wood.

I managed to obtain several fragments and one complete packet of eggs. The latter was fixed by the cement substance at its lower end to the wall of a beetle-boring three-eighths of an inch in diameter. It was attached at a distance of about three-quarters of an inch down the hole, and except at the lower end, which was imbedded in a depression in the wall, the packet was quite free. It was covered with a rather thick coating of a porous or vesicular cement substance, which also filled all the spaces between the closely-packed eggs. The latter were twenty-three in number, and their arrangement was in general in a longitudinal direction, the anterior ends pointing towards the free end of the packet, but was otherwise irregular.

The eggs are 4 to 4.8 mm. long, elongate-elliptical in form, finely and densely punctate, reddish-brown. There is a slightly impressed line encircling the egg close to its posterior end.

M. punctulatus has been fairly common also at Toronto this season. I found a pair on a white oak tree, the others on pine.

A NEW CECIDOMYIID ON GUTIERREZIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

Asphondylia gutierreziæ, n. sp.

♀.—Length slightly over 3 mm.; antennæ pale brown, 2 + 15 jointed, the first two joints darkened; eyes united on vertex; thorax reddish-brown, dorsally shining, naked, with four very thin longitudinal bands of hairs; femora pale brown, tibiæ and tarsi darker; wings well fringed with hairs; abdomen nearly naked, bright red, ovipositor and a dorsal apical patch white; ovipositor moderately long.

Pupa shell white, the anterior part faintly tinged with brown.

Gall a pale green fusiform or suboval swelling in the flower-head of *Gutierrezia sarothræ*, about 7 mm. long and 3 mm. broad.

Hab.—Las Vegas, New Mexico; collected by Wilmatte P. Cockerell; flies emerging October 31.

The colours of *A. gutierreziæ* are described from fresh material; dried examples will not be so bright.

THE GENERIC NAMES VATES AND THEOCLYTES.

BY JAMES A. G. REHN, PHILADELPHIA.

Recently the writer made the statement (Trans. Amer. Ent. Soc., XXVII., p. 87) that the generic name *Theoclytes* was a synonym of *Vates*, the latter being the older by one year. A further examination has shown that the matter should have been examined closer. Three generic names are involved—*Vates*, Burmeister; *Theoclytes*, Serville, and *Pseudovates*, Saussure—the included species of each being as follows:

Vates, Burmeister.

V. cnemidotus, Burmeister = *subfoliata*, Stoll.

V. orbus, Illiger.
V. macropterus, Stoll. } *Zoolea macroptera*, Stoll.

Theoclytes, Serville.

T. foliata, Licht. = *subfoliata*, Stoll.

T. undata, Fabricius = *Popa undata*, Fabricius.

T. chlorophœa, Blanchard.

Pseudovates, Saussure.

P. tolteca, Saussure.

The type of the genus *Vates* is therefore *subfoliata*, Stoll., the other two included species (synonymous) having been removed by Serville to his new genus, *Zoolea*, in 1839. As the species *subfoliata* was used by Burmeister (and is by elimination the type of the genus), it must be barred from consideration in the genus in which it was placed by Serville. The second species, *undata*, having been removed to another genus, the third, *chlorophœa*, must stand as the type. The last genus, *Pseudovates*, of Saussure, was based simply on *tolteca*, which is congeneric with *Vates*, and therefore the two are synonymous, unless the two types can be separated subgenerically, in which case the name *Pseudovates* is available for one. The revised generic names stand as in the following table:

Vates, Burmeister. Type, *V. subfoliata*, Stoll.

——— *Pseudovates*, Saussure.

Theoclytes, Serville. Type, *T. chlorophœa*, Blanchard.

While a few authors have followed almost the same pattern as this, the general tendency has been to distort the names by placing them to suit their fancy or their particular system of classification.

TWO NEW BLIND BEETLES, OF THE GENUS ADRANES, FROM THE PACIFIC COAST.

BY H. F. WICKHAM, IOWA CITY, IOWA.

The species of *Adranes* are to be looked for in nests of ants belonging to the genus *Lasius*. They are helpless creatures, lacking eyes and with much reduced mouth-parts, dependent probably upon the ants for their supply of food. They are carefully attended by their hosts, to whom they give requital in the form of a secretion, much appreciated by the ants, which collects on certain patches of hair situated on the tips of the elytra and on the base of the abdominal dorsum. The antennæ are much modified, consisting of only two joints, the second of which is very large and heavy, varying in form in different species.

Until recently but two species were known, namely, *A. cœcus*, Lec., from Pennsylvania, Georgia and Illinois, and *A. Lecontei*, Brendel, from the Mississippi, Potomac and Ohio* valleys. Some time ago I received from the Rev. Geo. W. Taylor a specimen which appeared to belong to a third species. It had been captured by him in an ants' nest near Nanaimo, Vancouver Island. My trip to the Pacific Coast has given additional specimens of the same kind, and also of a fourth species which is very distinct from any of the others.

While all of the *Adranes* are of much the same colour (a peculiar shining reddish yellow) and agree closely in general shape, they nevertheless offer structural characters, particularly in the male sex, which enable us to separate them readily. I regret not to have seen *A. cœcus*, which evidently approaches the form that I have called *pacificus* in size and in some other features. I annex a table which gives in brief the differentials necessary for specific discrimination :

Head cylindrical. Antennæ with second joint narrowed to tip. L. 1.8 mm..... *cœcus*, Lec.

Head narrowed behind.

Antennæ with second joint narrowed to tip.

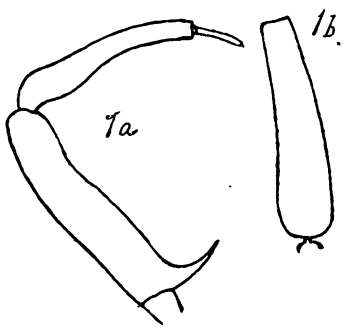
Smaller (2 mm.); middle tibiæ of ♂ not appreciably thickened near the base..... *pacificus*, n. sp.

*Dr. E. Wasmann has also a record of *A. Lecontei* from California. (Krit. Verz. d. Myrmekoph, u. Termitoph, Arthropoden, Berlin, 1894, p. 107.)

Larger (2.5 mm.); middle tibiæ of ♂ more slender and strongly thickened near base.....*Lecontei*, Brend.

Antennæ with second joint cylindrical, not appreciably narrow at tip; middle tibiæ of ♂ with a strong tooth about one-third from the tip.....*Taylori*, n. sp.

Figures of the antennæ and middle legs of the males of three of the above are given, the sketches having been made with the aid of a camera lucida. Care has been taken to get a like point of view in each case. The spine of the middle leg has been figured as part of the trochanter in *A. Lecontei* by Dr. Brendel*, who was misled, I suppose, by the use of imperfect lenses. In specimens of an *Adranes* from Iowa City, determined by him as his *Lecontei*, the spine is femoral in origin, as shown in my figure (Fig. 1a), to which I have added a sketch of the antennæ (Fig. 1b) for comparison with the others.



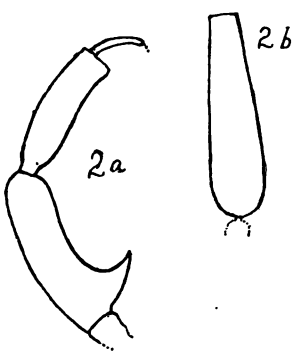
The new forms may be described thus: —

Adranes pacificus, n. sp.—Reddish yellow, less shining than *A. Lecontei* or *A. Taylori*. Above finely punctured, pubescence yellowish, recumbent, coarser than in either of the previously mentioned species and more inclined to form regular lines. Head (in profile from above) broadest just behind the antennæ, thence almost regularly narrowed to base, sides hardly arcuate, frontal margin truncate. Second antennal joint straight, distinctly narrowed to the tip and somewhat thicker in proportion to the length than in *A. Lecontei*. Pronotum resembling that of *A. Taylori*, but the lateral impressions are less deep, and in consequence the sides in front of them appear less bulging; basal fovea naked, deep and almost exactly circular. Elytra at base about equal to the base of the prothorax or very slightly wider, conjointly deeply

*Bulletin from the Laboratories of Natural History of the State University of Iowa, Vol. I., pl. VI., Fig. 3. The same origin is ascribed to this spine in *A. cæcus*, l. c. pl. VI., Fig. 5; and p. 221. However, I have not seen the latter species, and make no further comment.

triangularly emarginate, rapidly, slightly arcuately broadening to the tip, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence long, recumbent, very fine and sparse; arcuation of the juxta-basal portion of the margin more regular and less sudden than in *A. Lecontei*, which it closely resembles in the form of the impressions and foveæ. Body beneath of the same colour as above, scantly pubescent. Legs stouter than in *A. Lecontei* or *A. Taylori*, middle femora of male with a large strong curved basal tooth, middle tibiæ slightly curved, but without strong sinuation or tooth. Length 2 mm.

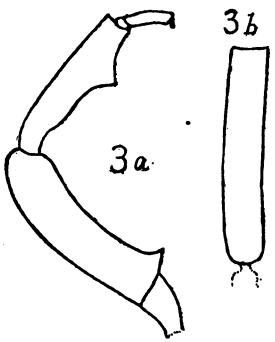
Type, ♂ from Sisson, California, in the Mount Shasta district. Collected by myself in a nest of a pale variety of *Lasius niger*, L. (det. Pergande), under the bark of an old stump, near the end of July, 1900. This beetle is readily distinguished from the other Pacific Coast species by the facies, smaller size and greater opacity. Fig. 2a shows the middle leg of the ♂, Fig. 2b the antenna.



Adranes Taylori, n. sp.—Reddish yellow, shining, above finely punctured and with rather long yellowish recumbent pubescence, which does not conceal the surface nor give the effect of opacity. Head (in profile from above) truncate anteriorly, sides gradually slightly divergent to a point behind the middle, thence rapidly narrowed to base. Antennæ with the second joint cylindrical, not tapering to the tip. Pronotum, broadest about one-third from the base, narrowing anteriorly to about the width of the head and posteriorly to near that of the elytra. Behind this broadest part is, on each side, an oblique impression, while on the median line near the base is a large rounded hairless fovea. Base of elytra equal to or slightly greater in width than that of the prothorax, conjointly deeply triangularly emarginate; rapidly arcuately broadening to apex, each with a tuft of long yellowish hair near the middle of the posterior margin, the exact shape of which is thus concealed. Abdomen above convex, surface more shining than that of the rest of the body, the pubescence rather long,

recumbent and very fine, much sparser than that of the elytra. Width at base (compared with the elytra) less than in *A. Lecontei*, the arcuation of the juxta-basal portion less pronounced. Impression and foveæ much as in *A. Lecontei.* Body beneath of same colour as above, shining, sparsely pubescent. Legs, ♀ unarmed, ♂ intermediate femora with a short stout basal tooth, middle tibiæ sinuate internally and with a strong triangular tooth, as large as that of the femur, at about one-third from tip. Length 2.5 mm.

Type, ♂ from Newport, Oregon; collected by myself in nest of *Lasius niger*, L. (det. Pergande), under a prostrate log, near the middle of July. Also received from Rev. Geo. W. Taylor, collected by him at Nanaimo, Vancouver Island, in March and April, and to him the species is dedicated in recognition of the value of his entomological and other researches into the fauna of his district.



The middle leg of the male *A. Taylori* is shown in Fig. 3a. It is quite characteristic and will readily distinguish this species from any other thus far known. The shape of the second antennal joint (Fig. 3b) is also peculiar to this insect.

CHANGE OF NAME.

On page 248 of Vol. XXXII. of the CANADIAN ENTOMOLOGIST, I proposed *pruinosus* for a species of *Tabanus*. Prof. J. M. Aldrich has kindly informed me that *pruinosus* has been used previously by Bigot for a species of that genus. My species is a true *Atylotus*, and Bigot's is placed in *Tabanus* in the strictest sense, but I prefer to change the name of my species to *Ohioensis*. JAS. S. HINE, Columbus, Ohio.

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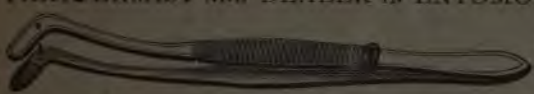
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The Canadian Entomologist

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REV. C. J. S. BETHUNE,

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The Canadian Entomologist.

VOL. XXXIII. LONDON, FEBRUARY, 1901. No. 2

Queen Victoria.

BORN MAY 24TH, 1819; ASCENDED THE THRONE JUNE 20TH, 1837; DIED JANUARY 22ND, 1901.

The death of our beloved Queen, who has been our sovereign for more than three score years, is to each of her subjects, in whatever part of the world he may be, a loss beyond what words can express. We have all been filled with reverence for her majesty—admiration for her character—and deep affection for her person. Whether we regard her as Empress and Queen in stately dignity—as sovereign ruler over the vast British Empire, inspired with justice, wisdom and truth—as wife and mother living a home life of purity, love and peace, unsullied by any stain,—in whatever aspect we regard her, our feelings, our judgment, are the same. The grief which now wrings our hearts is shared in, and sympathized with, by the nations of the world; everywhere there is the same tribute of respectful sorrow.

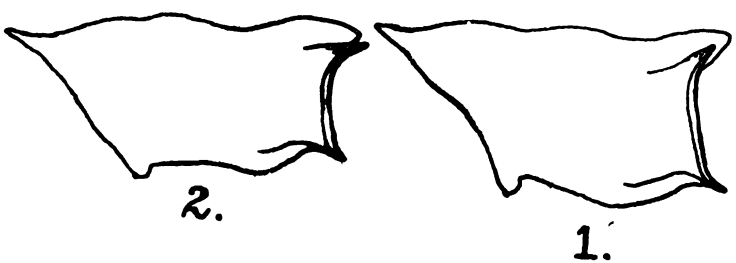
Victoria's name will ever stand in the annals of the world pre-eminent among exalted women; and it will ever remain in our hearts and memories as an example of all that is good and noble, of all that is pure and without reproach.

NOTES ON THE GENITALIA OF HALISIDOTA HARRISII, WALSH.

BY HARRISON G. DYAR, WASHINGTON, D. C.

I see by Mr. Lyman's address (1899) before the Entomological Society of Ontario that he is a convert to the view of the specific distinctness of *Halisidota tesselaris* and *H. Harrisii.* I believe this to be correct.

When I last referred to the genitalic differences of these species, I expressed a possible doubt that the apparent differences might be found evanescent in a large material. Having just examined 74 preparations, I do not find this to be the case. In *tesselaris* the upper point of the side piece is free from the outer lobe and projecting (fig. 2);



in *Harrisii* this point is concealed behind the lobe and pressed close to it (fig. 1). The differences are small, but readily perceptible. The preparations were made from two bred *tesselaris* and three bred *Harrisii;* afterward 69 captured examples were examined. These were a part of the specimens from Poughkeepsie, N. Y., recorded in Insect Life, and they proved to be 96% *tesselaris.* The total number captured should therefore be approximately 2,570 *tesselaris* and 106 *Harrisii. Harrisii* is evidently considerably the rarer species of the two.

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SOME PLANT-LICE AFFECTING PEAS, CLOVER, AND LETTUCE.*

BY E. DWIGHT SANDERSON.

Nectarophora pisi, Kalt., and varieties.

The "Green Dolphin" is one of the best-known pests of peas and vetches in Europe, though but little concerning its economy has been recorded by European writers. In this country, *N. pisi*, Kalt., has been noted by Thomas[1], Oestlund[2], and Williams[3], but as their specimens were never compared with any from Europe, and as plant-lice are exceedingly variable and descriptions of them are, therefore, often of but little value even when accurate, the identity of their specimens with the European forms has been somewhat in doubt.

At the beginning of the present outbreak of the pest in the spring of 1899, as specimens of *N. pisi* of both American and European authors were unavailable for comparison, and as most of the European writers described the species as very much smaller than the remarkably large form under consideration, the species was named *Nectarophora destructor* by Prof. W. G. Johnson[4], and described by him as new[5]. Prof. Johnson gives[4] Mr. Th. Pergande as authority for the species, stating that he "considers it an undescribed species," and adds, "Inasmuch as Mr. Pergande does not care to describe it, it is my privilege to name the insect."

In Dec., 1899, the attention of the writer was called to a species of *Nectarophora* doing serious injury to lettuce under glass. Careful study failed to reveal but a few minor characteristics by which this species could be separated from *N. destructor*, Johns., the chief difference being its smaller size, but many specimens were as large as small *destructor*. The similarity of this aphid to *destructor* led to a study of the plant-lice infesting lettuce foliage, and also of the variation in size, form and colour of *N. destructor*, taken at different times during 1899 and 1900. The following table gives the average measurements of different series of specimens of *destructor*, those of *N. pisi*, Kalt., as given by various authors, and those of *N. destructor* as described by Prof. Johnson. Numbers 3, 4, 5, 11, 17, 20, 21 and 22 are all unquestionably *N. destructor*, Johns.:

(*From the Entomological Dept. of the Delaware College Agricultural Experiment Station, Newark, Del.)

1 Thomas, 8th Rept. St. Ent., Ill., p. 64 (1879).
2 Oestlund, Bull. No. 4, Geol. and Nat. Hist. Surv., Minn., p. 82 (1887).
3 Williams, Spec. Bull. No. 1, Univ. Nebr., Dept. Ent., pp. 6, 9, 18, 20, 23 (1891).
4 W. G. Johnson, Bull. No. 20, n. s., Div. Ent., U. S. Dept. Ag., pp. 94-9 (1899).
5 W. G. Johnson, CANADIAN ENTOMOLOGIST, XXXII., pp. 55-60 (Feb., 1900).

Nectarophora pisi, Kalt., and varieties.

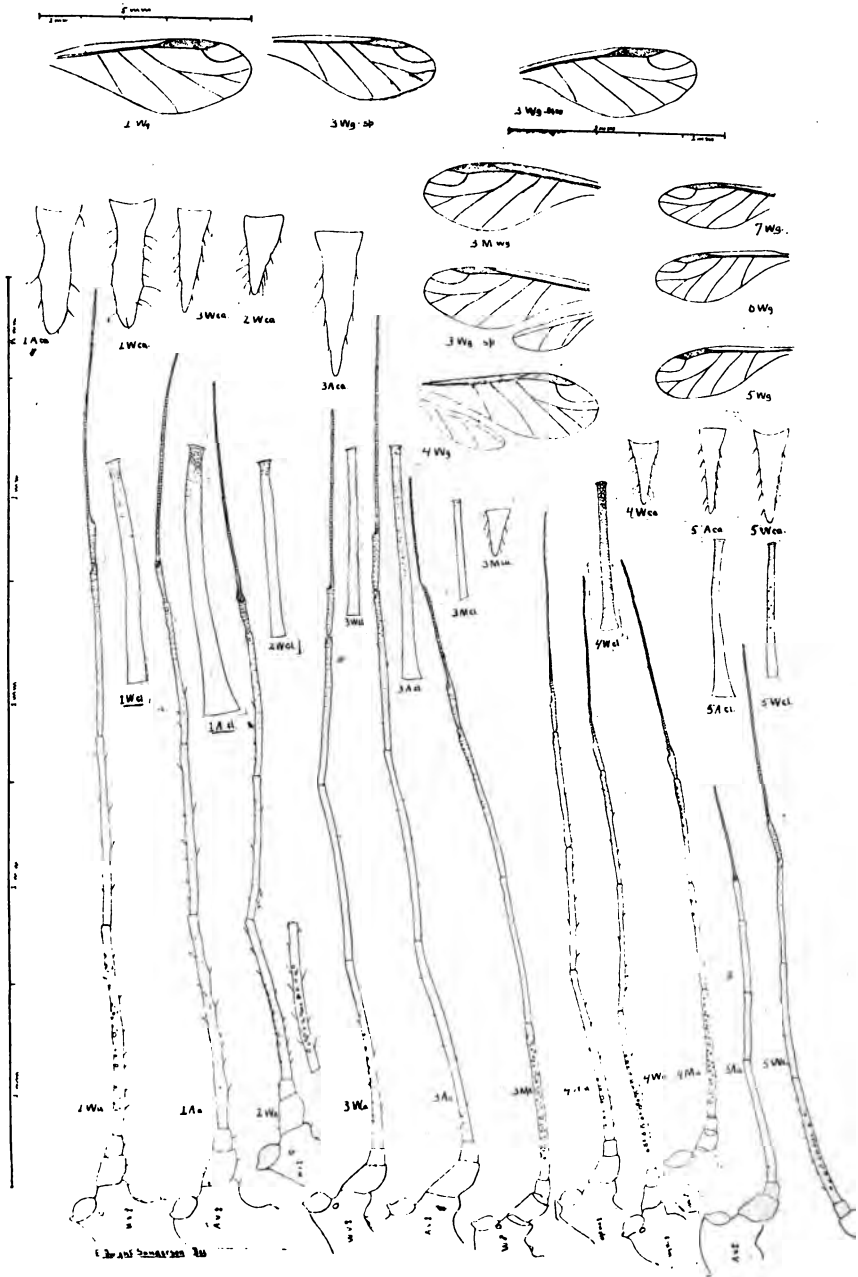
(Measurements in 1-100 millimeters.)

No.	Description.	Date.	No. Spec'ns	Wing Exp.	Length. L.	Width. W.	Antennæ. A. L'gth.	III.	IV.	V.	VI.	VII.	Tibia. T. I.	II.	III.	Cauda. ca.	Cornicles. cl.
	Winged Viviparous	*Female.*															
1	From G. B. Buckton	June 17, -47	1	1100	410	160	450	140	103	84	21	114	200	200	263	63	114
2	N. destructor, Johns.....	CAN. ENT. Feb., 1900		1100	400 -500	100 -115	525 (+30)	150	100	75	50	150				½cl.	100 -115
3	Newark, Del., on pea....	Nov. 1, 1899	1	1000	300	116	430	100	100	82	35	112	200	200	250	46	82
4	" "	Oct. 26, 1899	5	1000	320	110	434	94	87	82	30	113	182	180	240	48	86
5	" "	Oct. 10, 1900 Spring 1900, 1892	6	1000	345	115	427	95	90	83	30	116	181	186	255	49	86
6	Kaltenbach	1843			250 -300												
7	Koch*.....	1859		900	330	120	350	90	60	50		110	120	130	150	35	80
8	Oestlund.....	1887					(395)	90	75	70	20	110				45	90
9	Buckton.....	1875		914 -964	227	88	381										101
10	From G. B. Buckton.....		2		270	114	385	78	76	68	21	120	183	183	240	40	92
11	Newark, Del., on pea....	Nov. 17, 1900	13	930	314	105	390	88	81	72	28	97	162	162	225	42	70
12	Lexington, Ky., on lettuce	Feb., 1895	4		315	105	360	87	71	68	20	102	160	170	221	30	83
13	Newark, Del., on lettuce.	Dec., 1899	3	900	230	80	340	93	75	59	14	90	150	150	200	30	70
14	Balto. Co., Md., on lettuce	Feb., 1899	2	700 -800	235	85	313	82	61	56	14	100	145	145	185	33	71
15	Milford, Del., on pea	May 1, 1900	7	700	216	85	300	75	54	52	17	82	133	133	180	30	60
16	Iowa Agr. Coll., clover ..	Oct. 15, 1891	1		230	90	300	64	54	56	20	86	120		170	40	65

	Winged Male.																	
17	Newark, Del., pea.....	Nov. 17, 1900	3	900	250	95	362	77	71	73	23	102	157	150	190	24	50	
17*a*	Newark, Del., lettuce....	Dec., 1899	1	750	200	75	300	63	65	52	14	111	132	135	165	16	42	
	Apterous Viviparous	*Female.*																
18	From G. B. Buckton	June 17, -47	2		400	160	440	110	86	80	22	112	195	205	271	66	132	
19	N. destructor, Johns.....	CAN. ENT. Feb., 1900			400 -600	100 -200	Longer		than		wing	ed.				(50 -70)	+ 125 -200	
20	Newark, Del., on pea....	Oct., 1899 " 1900	13		320	115	450	112	92	80	28	108	191	187	274	66	113	
21	Milford, Del., on pea	May 1, 1900	10		339	159	451	111	91	80	294	107	186	185	270	70	110	
22	Newark, Del., on clover .	May, 1892																
23	Kaltenbach	1843			250 -400													
24	Koch*.....	1859			320	130	350	80	60	50		110	120	120	150	20+	80	
25	Taschenberg.....	1871			400													
26	Lexington, Ky., lettuce ..	Feb. 23, 1895	4	*	300			92	69	58	15	93	155	155	225	41	75	
27	Newark, Del., lettuce....	Dec., 1899	4		300	130	355	90	60	56	17	100	163	170	210	42	90	
28	Iowa Agr. Coll., clover ..	April 17, 1893	2		300	137	215	57	35	38	21	43	89	95	135	43	74	
29	Buckton.....	1875			270	127	355										88	

* Measured from figure—probably inaccurate. () Partly computed by writer.

CAN. ENT., VOL. XXXIII. PLATE 2.



This study showed that the measurements given in the description of the species by Prof. Johnson represented specimens in May and June, when the species is at its maximum size, but specimens much smaller were found at that season, and those collected in October of 1899 and 1900 were uniformly smaller. It was found that the average size of specimens measured was as near that of *N. pisi*, Kalt., of Oestlund, as *N. destructor*, Johns., with no marked difference in colour. A careful review of European literature showed the size of *N. pisi*, Kalt., as given by different writers, to be quite variable; the length, for instance, as given by Koch (No. 7) is 3.3 mm., while Buckton (No. 9) gives 2.27 mm., and Taschenberg states that the winged female is slightly shorter than the wingless (No. 25), which he describes as 4 mm. long. The coloration as given by these writers is also variable.

In October, 1900, a form of the winged female (No. 11)—described below—was found migrating from peas to clover, which was much darker and smaller than the summer broods and in many respects more similar to some of the descriptions of *N. pisi*, and at the same time the apterous females and nymphs were distinctly pulverulent, which was not observed in June, but is mentioned in descriptions of *pisi*. A few winged males (No. 17)—described below—were also secured.

Having become well convinced of the identity of the two species, specimens of *N. pisi*, Kalt., were secured from Mr. G. B. Buckton, F.R.S., Haslemere, Eng., who kindly lent me two slides containing several specimens in Canada balsam. The specimens of one slide, collected at "Southgate, June 17, -47" (1847?) (Nos. 1 and 18), were of exactly the same size as *N. destructor* as described by Prof. Johnson, with exception of segment VI. of the antennæ being very much shorter. They also differed in having the cornicles and antennæ (Pl. I., 1a., 1cl.) considerably thicker than the smaller specimens of *destructor*, though very probably this is largely due to their having been flattened by the pressure of the cover glass and the drying of the balsam. The surface of the tips of the cornicles is reticulated, which has not been observed in typical *destructor*. None of these differences can, however, be considered as of sufficient value to separate the species, especially when one considers the variability of the species as given by European writers. The specimens of the other slide, marked by Mr. Buckton, "*Siphonophora pisi*?—Fool's Parsley," are considerably smaller, but are similar to the smaller forms of *destructor* found here, and lack the reticulation on the cornicles. There

is little question, therefore, but that the species (*N. destructor*, Johns.) so injurious during the past two seasons is the well-known "Green Dolphin" (*N. pisi*, Kalt.) of Europe[6].

Past History.—In Europe the "Green Dolphin" has been known as one of the worst pests of peas and vetches for over a century. Kirby and Spence, writing in 1815, give an account of the damage done by this pest which corresponds very closely with our own experience, "those (aphids) which attack pulse spread so rapidly, and take such entire possession, that the crop is greatly injured, and sometimes destroyed by them. This was the case in 1810, when the produce was not much more than the seed sown; and many farmers turned swine into the pea fields, not thinking them worth harvesting. The damage in this instance was caused solely by the aphis, and was universal throughout the kingdom so that a supply for the navy could not be obtained. The earlier peas are sown, the better chance they stand of escaping, at least in part, the effects of this vegetable Phthiriasis." It is also remarked that the pest is worse in dry seasons.

The insect is evidently either native to America or has been established here for many years. The first record of its occurrence was in Minnesota in 1887 on Shepherd's Purse[7]. Since then it has been noted in Nebraska and Illinois on clover, beets, peas, and other plants.

Early in May, 1890, an experimental plot of crimson clover at this station was so badly attacked by what was undoubtedly this species of aphid that for a time it was feared the experiment would prove a failure.

One or two extensive growers of crimson clover inform me that they have seen this pest on crimson clover for at least six or seven years. As no other aphid is known to attack clover in any considerable numbers, there seems to be little doubt but that the same species has been present in Delaware for at least ten years. Mr. F. A. Sirrine writes me that Long Island pea growers state that "they had a similar trouble with their

6 The full bibliography of the species appears in the Report of the Del. Coll. Ag. Exp. Sta. for 1900. *Aphis ulmariæ*, Schrank, is undoubtedly the same species and several writers have preferred to use that name. Schrank's description, however, is not clearly recognizable, and I have preferred, therefore, to follow the majority of writers in using Kaltenbach's name. Exception might be taken to this usage, as very many aphids are not to be recognized from the original description of the species, but where types are not extant for purposes of comparison it would be much better were such descriptions discarded.

7 Thomas mentions it in Illinois in 1879, but it is doubtful whether his description applies to this species.

peas eight or ten years ago." In 1887 an aphid very similar to this species, and probably the same, was observed by Dr. L. O. Howard, U. S. Entomologist, on clover at Washington, D. C. Mr. R. H. Pettit, of the Mich. Agl. Experiment Station, informs me that one or two Michigan pea growers state that they have known a similiar plant-louse to infest peas for the past twenty years.

Fall Migratory Winged Viviparous Female.—Wing expanse, 9.3 mm. Length, 3.15 mm.; width, 1.05 mm.; Antennæ, 3.9 mm., III., 0.88 mm.; IV., 0.81 mm.; V., 0.72 mm.; VI., 0.28 mm.; VII., 0.97 mm. Tibia, I., 1.62 mm., II., 1.62 mm., III., 2.25 mm.; Cauda, 0.42 mm.; Cornicles, 0.70 mm. Average of 13 specimens.

Coloration same as male, except chitinous plates are slightly lighter, lateral spots and those above spiracles in abdomen are wanting, with two dark spots on subgenital plate, subventral plate green, lacking sensoria on V. antennal segment.

Apterous Viviparous Female.

Specimens late in October and in November are more or less covered with a distinct whitish pulverulence, are smaller, and darker green than in the summer.

Larvæ of these same broods have antennæ, cornicles and legs blackish or dark brown, body with more or less whitish pulverulence, which is especially marked and distinct on distal half of hind tibia; very different from larvæ in spring or summer.

Winged Male.—Wing expanse, 9 mm.; Length, 2.5 mm.; width, 0.95 mm.; Antennæ, 3.62 mm.; III., 0.77 mm.; IV., 0.71 mm.; V., 0.73 mm.; VI., 0.23 mm.; VII., 1.02 mm.; Tibia, I., 1.57 mm.; II., 1.50 mm.; III., 1.90 mm.; Cauda, 0.24 mm.; Cornicles, 0.50 mm. Average of 3 specimens.

Dorsal aspect head yellowish, ocelli black, eyes red, mesal line darker, a dark spot either side of meson caudally; ventral aspect head and thorax yellow, except mesosternum which is deep olive brown to blackish, shining, chitinous; rostrum reaches to centre of mesosternum, prothorax dorsally yellowish-green, thoracic dorsal plates dark-olivaceous to blackish; legs yellowish or reddish brown, tips of femora and tibia, and tarsi black; large blackish pleural spot on either side of mesothorax and two smaller spots caudad of it at bases of mesa and meta coxæ; abdomen light green, slightly whitish pulverulent, three or four lateral blackish spots cephalad of cornicles; cornicles green, tips black; cauda green;

irregular horizontal spots on either side of abdomen around pores of connexivum above spiracles.

VARIETIES.

Specimens of *Nectarophora*, on lettuce: collected at Lexington, Ky., in Feb., 1895 (Nos. 12, 26), kindly loaned me by Prof. H. Garman; on lettuce in Baltimore County, Md., Feb., 1899 (No. 14), by Prof. W. G. Johnson; and on clover at Ames, Iowa (Nos. 16, 28), by Mr. F. A. Sirrine; have all been carefully studied and measured. A similar form was also taken at Milford, Del., on peas, May 1, 1900.

The dimensions of series of these aphids, as given in the table, shade into each other and *N. destructor* and *pisi* so as to make it impossible to separate them satisfactorily on any distinctions of size. It should be remembered that the measurements of the table merely give the average size of each series and that individual specimens vary widely from them. Numbers 12, 13, 14, 15, 26 and 27 are of the same variety. They may be distinguished by segment III. of the antennæ of the apterous viviparous females bearing six to eight sensoria, about half of which are much larger than the remainder, while *N. pisi* has but one; the tips of the cornicles in both winged and wingless are reticulated as in No. 1 *N. pisi* from England, whereas in American forms of *N. pisi* (*N. destructor*) they are plain. A single winged male, seemingly of this species, was taken on lettuce at Newark, in Dec., 1899. It (No. 17a) is similar to the male of *pisi*, except that it is smaller and IV. has two sensoria, which are lacking in *pisi*, the sensoria on III. and V. being similar.

The winged (No. 16) and apterous (No. 28) viviparous females from Iowa lack the reticulation on the cornicles, and the sensoria are as in *N. pisi*, though they are so much smaller that they are probably a distinct variety. The apterous forms from Iowa (No. 28) are "stem mothers," having been hatched from winter eggs. They differ from the other apterous forms in the shorter antennæ and legs, and in VII. being shorter than III. It is not unusual, however, for the stem mother to differ from other broods. No distinctive characters could be found in the wing venation of any of these specimens.

For the present, therefore, from the material studied, we are obliged to consider all of these specimens as varieties of *N. pisi*, Kalt. A larger series and further observation of their life-histories may reveal specific distinctions. The present account is published merely to show the extreme

variability of this species (or, as it may prove to be, the likeness of several species), and the necessity of a careful study of it and allied species. The writer will be greatly indebted to any who may be able to aid him with material, preferably alive, for the prosecution of such a study.

Thomas's *S. pisi* (l. c.) does not seem to be the same as *N. destructor*, but is quite similar to the varieties described above.

N. erigeronensis, Thos., and *N. corydalis*, Oest., are very closely allied to *N. pisi*, but specimens of them have not come under our observation.* The types of neither seem to have been preserved.

(To be continued.)

*ADDENDA.—Since writing the above, Mr. O. W. Oestlund has kindly sent me specimens of these species. Concerning them he remarks:

"1. *N. erigeronensis* is well separated from *pisi* and *corydalis* by having the sensoria more numerous and scattered in several rows along the whole length of joint III., and by being raised above the surface or forming distinct protuberances. Front femur much shorter (0.70 mm.). Front wings shorter. Spur (VII.) of antenna equal to or not much longer than III.

"2. *N. pisi* is a much larger form. Sensoria less numerous (15–18) and nearly in a single row, and almost absent on apical ⅓ of segment; not forming protuberances. Front femur much longer. Front wings larger. Spur much longer than III. (1.20 : 0.90).

"3. *N. corydalis* comes very close to *pisi*, and possibly too close to stand, though in the general aspect of the insect it seems quite distinct. Size smaller. Sensoria fewer in number (12–15) and in a single row. Front femur, front wings, and spur much as in *pisi*."

The specimens sent me measured as follows:

Form.	Description.	Date.	No.	Wing Exp se.	L.	W.	Antennæ.						Tibia.			Ca.	Cl.
							L.	III.	IV.	V.	VI.	VII.	I.	II.	III.		
W. V. Female	N. pisi	Oct. 28, '00	3	850	270	90		80					150		210	32	85
A. V. Female.	"	"	3		295	100		89	70				155	160	225	42	95
W. V. Female	N. corydalis	Sep. 26, '85	4	800	208	85	290	65	57	60	15	88	130	130	190	34	64
W. V. Female	N. erigeronensis	June 27, '98	3	750	220	80	200	55	38	35	12	48	83	96	130	31	66
A. V. Female.	"	"	5		200		205	55	36	33	13	53	85	85	127	30	76

All were collected at Minneapolis, Minn.

This *N. pisi* is similar to Nos. 12, 13, etc. above, taken on lettuce, and shows the same differences between it and var. *destructor*. The specimens were collected on squash. The apterous viviparous female has 5 to 8 sensoria on III.

N. corydalis seems similar to No. 15 above. It does not differ materially from Oestlund's *pisi* (as he remarks), and I think it merely a variation, possibly a distinct variety.

N. erigeronensis is a quite distinct species. In the apterous viviparous female the cornicles are thicker, more finely reticulated at apex than in *pisi*, are blackish, reach beyond the cauda, curving outward; antennæ dark, 9 to 15 sensoria on proximal half of III. In the winged viviparous female the antennæ, tibiæ, distal half of femora, apical ⅔ of cornicles are blackish, cornicles reach to tip of cauda; sensoria numerous (20 or so) on III., and protuberant; capitate hairs scattering on antennæ and body. E. D. S.

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.-W. T.

BY F. H. WOLLEY DOD, CALGARY.

Calgary (altitude 3,400 ft.) is strictly a prairie city, situate at the junction of the Bow and Elbow rivers, about 40 or 50 miles from the true base of the Rocky Mountains. For several hundred miles to the east, the prairie is, with the exception of a few spots on river bottoms, absolutely void of either timber or scrub. A very few miles to the west the country becomes decidedly hilly, and in places densely covered with dwarf willows. Still further west the hills increase in height, shrubs become proportionately more abundant, and several species of poplars make their appearance, the north and west sides of the hills being usually densely wooded. By far the greater portion of the material from which this list has been compiled has been taken by myself and Mr. A. Hudson during the past seven seasons amongst these hills (3,600-4,000 ft.) near the head of Pine Creek, about sixteen miles to the south-west of Calgary. This "hill-prairie," as I will call it, and which may be looked upon as the boundary between the prairie and the foothills, is well watered by numerous creeks, and the valleys and hillsides—where not too steep—are largely grazed and cultivated, but otherwise splendid hunting grounds for the entomologist. Another favourite hunting ground, and one which has yielded many species not occurring nearer home, is about twelve miles further west, near Mr. Billings's lumber mill. Here the poplars have given place to spruce, fir, and pine; shrubless spots outside the timber are scarce, and swamps abound. Here, in short, commence the actual Rocky Mountain foothills. Had I had leisure to explore these foothills more thoroughly, I have no doubt my list would have been largely augmented. Two entomological trips have been made further into the hills to the south-west, to Mr. Lineham's lower log camp, on the south fork of Sheep Creek. On the first of these expeditions Mr. Hudson was successful in discovering several species of butterflies not seen elsewhere, but during the second, when I accompanied him, all the elements seemed combined against us.

From the end of October till nearly the end of April there is practically no outdoor work for the entomologist in this district. With the first few days of spring good work may be done after dark at sallow blossoms, provided the thermometer is a few degrees above freezing point. Almost before sallows have ceased to be attractive, *Erebia*

discoidalis and *Chionobas alberta* are out in swarms. Species continue to appear in gradually increasing numbers until July, which is perhaps the best all-'round month. Treacle may be worked with success from about the middle of June, sometimes earlier, and in some years (notably in 1894 and 1896) is very prolific until the middle of September, and attractive to a few autumn species even in early October. On one or two nights during the above mentioned years moths positively swarmed on the treacled fence posts. About eighty moths on a single treacle patch at one time and fifty-five or sixty species in a night's treacling is about my record. They couldn't have been thicker on the treacle, simply because there wasn't room! That was during hot, dry seasons. The last two seasons (1899 and 1900) have been cold and wet, and absolute failures as regards treacling, and Lepidoptera on the whole have been extremely scarce. When I say that during the present year (1900) we had four of five inches of snow on the ground on June 8th, and again on August 25th, and add, moreover, that these storms were only a very few degrees colder than many of those that occurred frequently during the whole summer, it may well be imagined that captures were few and far between. However, at this altitude and proximity to the eastern slope of the Rockies, summer frosts are of frequent occurrence even in the hottest seasons, and the minimum nightly temperature is rarely above 40 degrees. For some reason or other, treacle put on green poplars is rarely, if ever, of any use. The trees must be dead and dry. I usually treacle fence posts, preferring those with the bark on. Attraction of moths by light has not on the whole been by any means a success, though it has produced several species that have not been captured by other means. In a warm, dry season—*i. e.*, when moths are thickest—the sky is usually too clear for light to have sufficient attraction, and in wet seasons, when the sky is more frequently overcast and the nights consequently darker, moths are scarce. Owing to the shortness of the season, very few species are double-brooded here, and most of those that are are only partially so, the second brood consisting of but a few stragglers.

The fauna of this district was practically unknown five or six years ago, and even now specialists not only differ "inter se," but are often undecided as to the identity of some of my species even after seeing long series. The fact of living so far from "headquarters," of course, adds largely to my difficulty in getting correct names. Many of my names, therefore, are, and are likely to remain for some time longer, doubtful;

but where such doubt exists, I have, in the following list, explained the circumstances as best I can, quoting the authorities who have seen my specimens, and, where my own opinion differs from theirs, stating grounds for my verdict. Breeding from the egg would doubtless clear up many doubts, as well as cause many surprises, but, unfortunately, I have never been able to spare the necessary time and attention for such useful experiments. It is also much to my regret that I have never been able to spend much time collecting after the middle of July. On this account I am very poorly represented in some obscure species, notably in the genus Argynnis. This is the more unfortunate by reason of some of the representatives of that genus here in the West being very difficult to place. My thanks are due to Prof. J. B. Smith, who has done all in his power to assist me in naming my Noctuidæ; also to Messrs. Elwes, W. H. Edwards, Drs. Ottolengui, Fletcher, Skinner, Holland, and others who have from time to time named specimens for me. Mr. Bean worked the Laggan district for several years, in the mountains near the western boundary of Alberta, and a few of my records are on his authority. Mr. Sanson, of Banff Museum, and Mr. P. B. Gregson, of Lacombe, about a hundred miles north of Calgary, have also kindly assisted with supplementary lists.

(To be continued.)

ON SOME DIPTERA BRED FROM COW-MANURE.

BY L. O. HOWARD, WASHINGTON, D. C.

In the summer of 1889, while engaged in an investigation of the habits and life-history of the horn fly of cattle (*Haematobia serrata*), the writer at various times brought to Washington from different points in Virginia, large quantities of cow-manure collected in the field, and eventually succeeded in working out the complete life-history of the horn fly, as displayed in Insect Life, Vol. II., No. 4, October, 1889. In this article the statement is made, in concluding, that the observations were greatly hindered and rendered difficult by the fact that fresh cow-dung is the nidus for a number of species of Diptera, some about the same size and general appearance as the horn fly, and that no less than twenty distinct species of flies had been reared from horse- and cow-dung, mainly the latter, and six species of parasitic insects as well. The plan finally adopted of securing the isolation of the horn flies was to remove the eggs

from the surface of the dung and place them with dung which was absolutely fresh and collected practically as it fell from the cow. A report upon the other species was promised, but was never published, although Professor Riley, in his report for 1890, listed eight parasites, only two of which were specifically determined.

The writer's recent investigations of the insect fauna of human excrement (Proc. Wash. Acad. of Sciences, Vol. II., pp. 541–604—Dec. 28, 1900) aroused his interest in the general subject of coprophagous insects, and the flies reared in 1889–90, from cow-dung, were looked up and have been named by Mr. D. W. Coquillett. The list is so interesting that it should be recorded. It will be noticed that several of the species are identical with those found breeding in human excrement. These are: *Sarcophaga incerta*, *Helicobia quadrisetosa*, *Musca domestica*, *Morellia micans*, *Myospila meditabunda*, *Ophyra leucostoma*, *Sepsis violacea*, *Sphaerocera subsultans* and *Limosina albipennis*. The rearing of *Ceratopogon specularis* from cow-dung is of especial interest, since, down to the record in the Washington Academy paper just referred to, no insects of this genus had been found to be coprophagous. Some of the other records are interesting for the same reason. The list follows:

Family CECIDOMYIDÆ.

Diplosis, sp. Issued Dec. 26, 1889; and Jan. 18, 1890; 4 specimens.

Family MYCETOPHILIDÆ.

Sciara, sp. Issued March 26 and 29, 1890; 2 specimens.

Family CHIRONOMIDÆ.

Camptocladius byssinus, Schrank. Issued Jan. 2, 1890. Issued Dec. 31, 1889; and March 25, 1890; 9 specimens.

Camptocladius minimus, Meigen. Issued Dec. 23, 26, 27, 30 and 31, 1889; and Jan. 13, 18, and March 25, 1890; 12 specimens.

Ceratopogon specularis, Coq. Issued August 28, 1889. Issued Dec. 30, 1889; 6 specimens.

Psychoda minuta, Banks. Issued Dec. 26, 30 and 31, 1889; and Jan. 11, 1890; 4 specimens.

Family RHYPHIDÆ.

Rhyphus punctatus, Fabr. Issued Sept. 2, 3 and 4, 1889. Issued Jan. 13, 16, 18, 20, 22, 24 and 29, Feb. 1, March 26 and 29, and April 5 and 9, 1890; 64 specimens.

Family SARCOPHAGIDÆ.

Sarcophaga incerta, Walker. Issued Aug. 31, 1889. Issued Aug. 30, 1889; 7 specimens.

Sarcophaga, sp. Issued April 23, 1890; 1 specimen.

Helicobia quadrisetosa, Coq. Issued Aug. 6 and 30, 1889; 2 specimens.

Pollenia rudis, Fabr. Issued Dec. 23, 1889; 1 specimen.

Family MUSCIDÆ.

Musca domestica, Linne. Issued Aug. 30 and Sept. 2 and 4, 1889; 20 specimens.

Morellia micans, Macq. Issued Aug. 30, 1899. Issued Dec. 23, 26, 27, 28, 30 and 31, 1889; Jan. 2, 6, 8, 9, 10, 11, 13, 14, 16, 17, 18, 20, 25 and 27, Feb. 1, March 25, April 5 and 9, 1890; 125 specimens.

Myospila meditabunda, Fabr. Issued Aug. 26, 28, 29, 30, Dec. 23, 1889; Jan. 9, March 25, 26, April 2, 9, 14, 15, 1890. Issued April 5, 1890; 48 specimens.

Hæmatobia serrata, Desv. Sept. 17; 2 specimens.

Family ANTHOMYIDÆ.

Hydrotæa armipes, Fallen. Issued Sept. 27, 30, Oct. 4, 1889; Jan. 2, 6, 7, 8, 9, 10, April 24, 1890; 38 specimens.

Hyetodesia umbratica, Meigen. Issued Feb. 13, 21, April 2, 9, 14, 15, 1890.

Ophyra leucostoma, Wied. Issued Sept. 6, 1889; 11 specimens.

Limnophora, sp. Issued Aug. 30, 31, 1889; 5 specimens.

Cœnosia lata, Walker. Issued April 25, 1890; 1 specimen.

Cœnosia flavicoxæ, Stein. Issued Aug. 31, 1889; 4 specimens.

Phorbia, sp. Issued March 29, 1890; 1 specimen.

Family SEPSIDÆ.

Sepsis violacea, Meigen. Issued Aug. 28, 1889; 8 specimens.

Family BORBORIDÆ.

Sphærocera subsultans, Fabr. Issued Aug. 30, 1889; 7 specimens.

Limosina albipennis, Rondani. Issued August 28, Dec. 23, 1889; 2 specimens.

ACKNOWLEDGMENT.

I desire to publicly express the deep indebtedness of the Entomological Society of Ontario to O. C. Poling, Esq., of Quincy, Ill., for his generous gift to its exotic collection, of a box of mounted butterflies in prime condition, numbering 50 specimens of 30 named species and varieties, many of them being exquisitely beautiful forms.

J. ALSTON MOFFAT, Curator.

NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

(Continued from page 11.)

EUTETTIX MILDREDÆ, n. sp.

Form and general appearance of *pulchella*; colour pattern of *scaber*, but with extra markings, and different colours on pronotum and elytra. Length, 5.5 mm.; width, 1.75 mm.

Vertex slightly angularly rounded, transversely depressed before the apex; front as in *scaber*, the margin between front and vertex more strongly produced. Pronotum slightly angularly rounding anteriorly, much more so than in *scaber*; lateral angles scarcely apparent, rounding from eye; pronotum and scutellum convex, elevated.

Colour: vertex orange yellow, paler at base; scutellum orange, the basal angles and the margins at apex irrorate with fuscous. Pronotum dirty white, some black spots next the eyes; disc irrorate, pale olive brown, omitting an oval spot on the posterior disc on either side and the median line. Elytra milk white, with black margined areas of olive brown, as follows: All of clavus except a semicircular spot at base and another at middle of claval suture; an oblique band on corium, beyond this spot narrowing to the costa. There are three pairs of black spots along the sutural margin of clavus, the apical pair largest. The claval suture between the white spots, and the anterior and costal margins of the oblique band, heavily black. Inner apical cells and a few spots on costa irrorate with black. Face orange, a black spot on outer angle of either lora. Below pale yellow and fuscous.

Genitalia: ultimate ventral segment of the female about twice the length of the penultimate, the posterior margin broadly, slightly rounding, the median third produced in two rounding lobes; the notch between them not as deep as their length, the lobes usually black; male valve obtusely triangular, a little over half the length of the ultimate segment; plates long triangular, about three times the length of the valve, the apex attenuate, filamentous, together with the margin clothed with long silky hairs.

Described from three females from Colorado Springs, taken by the author, and fourteen examples of both sexes from Manitou, collected by Prof. Van Duzee. This is one of the prettiest Jassids that I have ever seen, and I take pleasure in naming it after my wife, whose careful drawings will add much to the value of my future synoptic work.

EUTETTIX PERELEGANTIS, n. sp.

Form and colour pattern of *Mildredæ*, slightly smaller and darker. Length, 5 mm.; width, 1.5 mm.

Vertex slightly more angular than in *Mildredæ*, distinctly longer on middle than against eye, transversely depressed; front narrower than in *Mildredæ*, not rounding in to the clypeus. Pronotum not as convex, the posterior margin scarcely emarginate.

Colour: vertex pale creamy, six equidistant, pale fulvous spots on margin, basal half sparsely irrorated with pale fulvous. Pronotum dirty white, heavily marked with black behind the eyes; a broad parellel margined stripe on either side the median line, olive brown. Scutellum brownish fuscous, irrorate with pale, a small spot at apex, a pair of larger quadrangular ones on lateral margins back of the suture, and a minute one at each basal angle, milk white. Elytra, colour and pattern as in *Mildredæ*. Face dirty white spots on loræ as in the former species. Below fuscous and pale.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the posterior margin broadly rounding, the median fourth roundingly emarginate one-fourth the depth, with a stout median tooth often bidentate at the apex; male valve obtusely triangular, the apex roundingly truncate, trilobate; plates three times the length of the valve, long triangular, the apex acute, filamentous, margins with silky hairs.

Described from five females and one male from Salida, Ridgway and Durango, Colo. Readily separated from *Mildredæ* by the colour pattern of the vertex, pronotum and scutellum, and the distinct female segment.

EUTETTIX SAUCIA, n. sp.

Form and general appearance of *scaber*, smaller and paler, the vertex mostly pale. Length, 4.5 mm.; width, 1.5 mm.

Vertex longer, narrower and more angulated than in *scaber*; face narrower above, longer than its basal width, rounding to the clypeus. The pronotum broadly and evenly rounding in front, truncate behind, almost twice the length of the vertex.

Colour: vertex pale yellow, six minute points on anterior margin and three irregular irrorate patches on posterior margin brownish fuscous. Pronotum white, coarsely irrorate with dull brown except a narrow lateral margin and traces of three pale lines. Scutellum more finely irrorate, three ivory white points in a triangle beyond the transverse line. Elytra

milky white, closely and finely irrorate with dull brown, as follows: All of clavus except a narrow strip along basal two-thirds of claval suture, once or twice interrupted and broadened at the end; a rather narrow oblique strip across corium beyond this and some irregular markings towards the apex, which form two definite spots on the costa. Two pairs of pale spots along the sutural margin of clavus. Face pale yellow, below pale and fuscous.

Genitalia: ultimate ventral segment of the female nearly twice longer than penultimate, the posterior margin nearly truncate from the rounding angles, with two triangular, slightly protruding, median teeth; male valve very obtusely triangular; plates long triangular, their apices attenuate, black, clothed with fine silky hair.

Described from a pair from Denver, a male from Fort Collins, Colo., and another from Tucson, Ariz. This species is closely allied to *scaber*, from which the longer vertex, smaller form, lighter colour and absence of distinct band on vertex will easily distinguish it.

EUTETTIX SCITULA, n. sp.

Resembling *seminuda*, but with the pronotum darkened up. Length, 5.5 mm.; width, 1.5 mm.

Vertex almost parallel margined, twice wider than long, half the length of the pronotum, strongly depressed. Front rather flat, its length and breadth about equal. Pronotum long, its lateral angles distinct, disc but feebly convex.

Colour: vertex pale creamy yellow, six pale fulvous spots along the anterior margin, sometimes a pair of spots near eyes on basal half. Pronotum dull white, coarsely irrorate with dark fulvous, omitting the pale yellow anterior margin. Traces of three pale stripes. Scutellum pale, the fine dark brown irrorations usually heaviest in a spot just within the basal angles on either side, and another behind the transverse suture. Three spots in a triangle on apical half ivory white; posterior disc light. Elytra milky white, a few coarse brown irrorations along the humeral and sutural margins before the middle, a transverse band behind the middle as in *seminuda*, but darker brown, and some irregular infuscations towards apex. Face and below pale yellow, pale fuscous arcs on front.

Genitalia: ultimate ventral segment of female twice the length of penultimate, the posterior margin slightly rounding, with two small roundingly angular, median teeth; male valve obtusely triangular; plates long triangular, their apices attenuate, infuscate.

Described from numerous specimens from Fort Collins, Pueblo, Salida and Grand Junction, Colo. This species is most closely related to *seminuda*, but the genitalia and pronotal band will at once distinguish it.

EUTETTIX PULLATA, n. sp.

Form and general appearance of *scitula*, but darker, approaching *perelegantis* in shade, but lacking the definite pattern of that species. Length, 5.5 mm.; width, 1.5 mm.

Vertex two and one-half times wider than long, half the length of the pronotum, transverse depression very shallow, front broad and flat. Pronotum rather flat, scutellum transversely depressed, the apex swollen, elevated.

Colour: vertex white or pale yellow, a narrow fuscous line just in front of eyes, in front of which are four dots, and behind which are three large irregular, sometimes confluent, irrorate patches. Pronotum light, coarsely and somewhat sparsely irrorate with brown. Scutellum with a brownish fuscous patch just within each corner, disc pale or orange yellow. Elytral pattern as in *scitula*, but broader and darker; clavus entirely reticulated except for two transverse bands, one at base and a broader, interrupted one before the middle, the white area of the corium with a few dots or reticulations.

Genitalia: ultimate ventral segment of female three times the length of the penultimate, the posterior margin broadly rounding, the median fourth triangularly excavated, the apex of this excavation broad, rounding or bidentate; male genitalia as in *scitula*, valve obtuse, plates long triangular, the margins straight, tips attenuate.

Described from eighteen specimens from Manitou (Van Duzee), and five from Colorado Springs and Salida, Colo., by the author.

EUTETTIX MUNDA, n. sp.

Form of *jucunda*, Uhler, longer and redder. Resembling *costamaculata*, Van D., but with the costa reticulate. Length, ♀ 6 mm., ♂ 5 mm.; width, 1.75 mm.

Vertex sloping, transversely depressed, parallel margined, three times wider than long, two-fifths the pronotal length; front longer than its basal width, the margins evenly narrowing to the clypeus. Elytra broad, much longer than the body, the apices flaring; venation distinct, the second cross nervure present, joining the fork of the inner branch of the first sector in nearly a straight line, the inner continuation of this fork leaving this line at about the middle.

Colour: vertex fulvous, a pair of approximate spots on tip, and sometimes a spot on either side of disc at base, fuscous. Pronotum pale olive, somewhat washed with fulvous, the posterior disc omitting the margins irrorate with testaceous. Scutellum pale, the apex and a point on each lateral margin ivory white, a pair of spots between these, black, a large spot just inside either basal angle and a pair of dots on disc testaceous. Elytra milky white, reticulated with coarse pigment lines between the sectors, and washed with brown; a definite light band at base, widest on the costa, and a narrower, less definite one across the second cross nervure, a heavy fuscous spot before the middle of the sutural margin, a smaller one behind, shut off by a white crescent, and a third at apex of clavus. Apical cells somewhat infuscate. Face fulvous, below pale fulvous.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the lateral margins narrowing to the slightly produced lateral angles, posterior margin between these angles truncate with a slightly produced, rounding, median lobe. Male valve obtusely angular, the apex produced, plates broad, slightly concavely narrowing to an acute point, four times the length of the valve, the apex curving up.

Described from seven females from Palmer Lake, Salida, Ridgway, Dolores and Durango, Colo., and one from White Mts., N. Mex., from Prof. Cockerell.

EUTETTIX MANITOU, n. sp.

Form and general appearance of *modesta*. Smaller and more distinctly golden yellow, especially in the male. Length, ♀ 4.5 mm., ♂ 3.75 mm.; width, ♀ 1.5 mm., ♂ 1 mm.

Vertex a trifle over half as long as its basal width, evenly rounding or very slightly angulate, disc slightly depressed, passage to front more rounding than in the preceding species. Pronotum more rounding anteriorly than usual in this genus. Elytra very flaring in the female, scarcely so in male, venation as in *oculea*, claval nerves tied together and to the suture before the middle, central anteapical cell constricted, usually divided.

Colour: female, vertex pale yellow, a pair of approximate spots at apex fuscous. Pronotum pale olive washed with golden, omitting about three pale stripes. Elytra milky, nervures brown, becoming fuscous before apex and on costa, disc with a testaceous brown cloud which is interrupted by a narrow, parallel margined, transverse light band just before the black-tipped clavus and another irregular band before the

apical cells. A few light spots at base of clavus and along the suture. Male, vertex lemon yellow, pronotum, scutellum, all the clavus and the adjoining part of corium bright golden yellow. Apical and costal margins of elytra yellowish subhyaline, the apical veins and the apex of clavus fuscous, some milky spots around the second cross nervure.

Genitalia: ultimate ventral segment of female three times the length of the penultimate, the posterior margin very slightly rounding with a broad, median production which is rounding or slightly bilobed; male valve very broad, obtusely rounding, the apex produced, plates four times the length of the valve, concavely narrowing, the margins and apex upturned.

Described from four females and two males from Manitou and one male from Dolores, Colo. The two Manitou males were taken by Prof. Van Duzee. The females of this species are quite similar to *modesta*, but the male is much smaller and of a bright golden yellow. The genitalia are quite distinctive.

EUTETTIX OCULEA, n. sp.

Similar to *jucunda* in form, slightly broader and shorter, vertex fulvous. Eyes bright red. Elytra lacking the brownish cast of *munda*. Length, ♀ 4.75 mm., ♂ 4.25 mm.

Vertex not quite half as long as its basal width, two-thirds the length of the pronotum; the front longer than its basal width, clypeus broadly expanded at apex. Elytra rather broad and flaring, much longer than body, venation as in *munda*.

Colour: vertex fulvous, a pair of spots on the apex, a line in the depression and a spot on either side of the disc testaceous. Pronotum milky, the anterior margin washed with fulvous, anterior half of disc irrorate with fuscous. Scutellum pale fulvous, the basal angles and a pair of spots on the disc testaceous, the transverse line black. Elytra milky, the nervures and transverse pigment lines along claval suture, the costal margin and a spot in the central anteapical cell fuscous. A few fuscous spots along the sutural margin and on the apical veins. Face fulvous, front washed with testaceous, femora dark. Eyes bright red.

Genitalia: ultimate ventral segment of female three times the length of the preceding, lateral margins narrowing, posterior margin slightly angularly produced from just within the lateral angles, the apex roundingly bilobed; male valve very broad and short, posterior margin nearly truncate, with a median tooth, plates broad, concavely narrowing, their apices attenuate, the inner margins of which are concave.

Described from fourteen specimens from Rifle, Ridgway and Dolores, Colo. This and the two preceding species belong to a small group which includes *jucunda*, Uhler; *costamaculata*, Van D., and *modesta*, O. & B. They possess the second cross nervure, and have been referred to *Allygus* by some authors.

ATHYSANUS LITIGIOSUS, n. sp.

Broad and short, vertex almost parallel margined. Colour pale, with three transverse bands on vertex and dense irrorations on pronotum and elytra fuscous. Length, 5 mm.; width, nearly 2 mm.

Vertex broad and short, scarcely extending in front of the eyes, two and one-half times wider than long, scarcely longer on middle than against eye. Front very broad above, narrow below, scarcely longer than wide, disc feebly convex. Pronotum broadest behind, where it equals or slightly exceeds the width of the eyes, nearly three times the length of the vertex. Elytra broad, venation strong, resembling *extrusus*, the central anteapical cell rather long, enlarged at the apex.

Colour: anterior half of vertex black, almost divided into two transverse bands by a light line which is parallel with the yellow line separating the vertex and front, posterior half of vertex orange yellow, divided by an interrupted transverse fuscous band. Pronotum ivory white, heavily irrorate and vermiculate with fuscous, a few definite spots behind the eyes. Scutullem dark testaceous, the margins and a pair of irregular longitudinal lines white. Elytra ivory white, the nervures and many irregular reticulations fuscous, a band on tip and another across the apex of the clavus, a spot on the costa between the bands and another in the inner discoid cell fuscous. Between these bands subhyaline, especially along the margin. Face all black except a light line just below and parallel with the basal line. Legs black, the spines and an annulus on the posterior tarsus orange.

Genitalia: male valve broad and obtuse, angular, plates broad at base, about twice the length of the ultimate segment, roundingly narrowing to the acute apices, from which extend a pair of short divergent filaments.

Described from a single male received from Mexico (O. W. B.); probably from Cuernavaca. It is very distinct from any described form, and is not a typical *Athysanus*. The head and markings suggest *Scaphoideus*, but the form is too broad. The elytra are very much like some *Phlepsius* forms.

NEPTICULA POMIVORELLA, PACKARD; ALIAS MICROPTERYX POMIVORELLA, PACKARD.

BY AUGUST BUSCK, WASHINGTON, D. C.

During a visit to Professor Fernald, in Amherst, Mass., last spring, he showed me a Nepticula, bred from Apple, which he had described in manuscript as a new species, but which he afterwards had suspected to be *Micropteryx pomivorella*, Packard.

From reading the description and life-history of Packard's species, I felt sure that it was a Nepticula and presumably the same as Professor Fernald's species, and a week after, while studying the collection in the Agassiz Museum, Cambridge, I obtained definite proof that we were right.

There I found Packard's type—imago and cocoon—in rather poor condition, but easily recognizable as a typical Nepticula and similar to a large series of fine bred specimens in the U. S. National Museum.

The habit of this species of forming its cocoon on the twigs or the branches instead of descending to the ground, as is rather more common in the genus, makes the cocoon liable to be confounded with that of *Coptodisca* (Aspidisca) *splendoriferella*, Clemens, which is also frequently found in numbers on Apple.

Both have been mistaken for scale insects.

By a common hand-lens, however, they can be easily separated, as the Nepticula cocoon is made of matted silk, while the Coptodisca cocoon consists of two small, oval, pieces of the epidermis of the leaf cut out and spun together at the edges and fastened to the twig by small short silk bands.

The mines of the two insects are also easily distinguished, that of the Nepticula being a long narrow serpentine track only slightly widened as the larva grows, and, if empty, with a semicircular slit at the end in the upper epidermis, through which the larva has escaped; while the Coptodisca mine, which also begins as a narrow track, soon broadens out into a several times wider, more or less circular blotch, and when empty shows the oval hole in the leaf, where the larva has cut out the upper and lower epidermis for its case.

To distinguish between the shining dark Nepticula imago with its tufted reddish-yellow head and the large eye-caps and that of the equally shining light-coloured smooth-headed Coptodisca does not of course present any difficulties.

The following are some of the more important references only to:

Nepticula pomivorella, Packard; *Micropteryx pomivorella*, Packard, 17th Ann. Rep. Bd. Agr., pp. 237–8, 1870; Amer. Naturalist, Vol. IV., p. 685, 1871; Hayden, Bull. Geo. Survey, Vol. IV., p. 157, 1878; J. B. Smith, List of Lep. No. 6020, 1891; Bull. No. 26 (new series), Dept. of Agr., p. 94, 1900.

DESCRIPTIONS OF SOME NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, M. D., DECATUR, ILL.

Euhalisidota Otho, n. sp.
Edema Suavis, n. sp
Dasylophia Saturata, n. sp.
Dasylophia Melanopa, n. sp.
Euthyatira Superba, n. sp.
Feralia Brillians, n. sp.

Euhalisidota Otho, n. sp.

♂, expanse 2⅜ in.; ♀, 2½ in. Fore wings long, pointed, apices depressed, of a uniform pale, rather dirty yellowish colour. There is a row of short intravenular dashes which form a narrow blackish line from apex to inner margin close to thorax. In the females this is almost straight, in the males it has somewhat of a downward curve. Another row of somewhat sagittal-shaped spots forms a second dark band from apex to inner margin a little within inner angle. Hind wings yellowish, semitranslucent, inner third dusky. Discal dot small, black. These markings, while distinct, are not heavy or pronounced. Thorax a little darker than wings. Abdomen dusky above, anal tuft yellowish. Beneath as above, only fainter. Thorax, legs and abdomen same, except inner side of fore femora, which are somewhat orange. Palpi dusky at extreme tip. Antennæ dusky, narrowly bipectinate in ♂, broadly so in ♀. The ♂ has the dusky shades darker than in the ♀, the abdomen being quite dark blackish brown above, contrasting with the light anal tuft. Types 2 pair in my collection from Huachuca Mt., Arizona. I take pleasure in naming this species after Mr. Otho C. Poling, of Quincy, Ill., as a slight token of my appreciation of the many favours he has done me.

Edema Suavis, n sp.

Western examples of Albifrons differ from the eastern in having the dark shade below the costal white patch considerably darker. The discal mark is short, thick and black. The collar is very dark grayish black, the thoracic patch being only a little if any lighter. Hind wings of male white, slightly dusky at base of fringes. In the female the hind wings are dusky, about same as in Albicosta. The pectinations of the ♂ antennæ are considerably longer than in Albicosta, which character seems to me to entitle the insect to specific rank, otherwise I should consider it a mere variety of Albifrons. Types 4 ♂ and 1 ♀ in my collection from Glenwood Springs and Durango, Colo.

Dasylophia Saturata, n. sp.

Pale yellowish or buff colour, most of the veins rendered prominent

by light brown edging on both sides. Inferior margin slightly grayish. No black basal dash as in Anguina and Melanopa. Spots at internal angle prominent. The dark shade following t. p. line about same as in Anguina, but somewhat more prominent from the contrasting lighter shade. Hind wings yellowish white, veins slightly dusky. Type 1 ♂ in my collection from Denver, Colorado. This is probably the Western form of Anguina, but it must be quite rare, as it is the only one I have ever received. The typical form I have from Texas, Illinois, Iowa, and Manitoba, as well as the Eastern States. The uniform buff colour, pale secondaries, and lack of the basal dash, present an appearance quite different from the commoner Eastern form.

Dasylophia Melanopa, n. sp.

Considerably larger than Anguina, the ♂ being 1 and 11-16 inch in expanse and the ♀ 1 and 15-16. Palpi externally flesh-coloured, bordered above and below with dark brown. Vestiture of head and collar ochraceous, of a darker shade between the antennæ. Patagiæ dark gray with a narrow central black line. Thorax ochraceous centrally in front, else dark gray with traces of narrow black longitudinal lines. Abdomen evenly coloured, dark fuscous. Lighter beneath. Legs rather heavily coated with rich brown hair externally, lighter internally. Fore wings have a subquadrate basal flesh-coloured patch, the margin of which begins at base of costa, extends in an even gradual curve to where the t. a. line crosses median vein; from this point it follows the t. a. line downward a short distance and then returns to base of wing. The median vein through this space is of a somewhat darker brown. The basal space above this patch is of a rich dark brown colour, sharply limited externally by the t. a. line. The remainder of the basal space, the lower third of the terminal and the whole of the median space is of a dark gray colour, rather thickly speckled with black. The costal edge of the median space is lightly washed with reddish. A very dark brownish shade covers that portion of the wing from the t. p. line to apex, darkest along costa, gradually merging into a paler yellowish brown patch below and to the outer side. This dark subapical patch extends along the t. p. line to the median vein, and seems to be a continuation of the dark basal patch, the gray median space cutting sharply through the middle of it. Four or five minute yellowish points on costa between apex and t. p. line at regular intervals. There are two black spots inside the terminal line in the submedian space and two opposite these, external to it. T. a. line

double, distinct, filled with gray, quite evenly scalloped. T. p. line distinct, especially above median vein, light filled. Subterminal line brown, deeply toothed above median vein, more even in the next two spaces and reduced to two small round spots in two following. The spaces between the teeth down to the median vein are filled with bluish gray externally and yellowish brown internally, the veins being narrowly lined with brown. Three or four dark dashes precede the lighter space. A fine dotted line at base of fringes, which are yellowish gray, darker at ends of veins. Secondaries blackish fuscous externally, gradually lightening somewhat internally, fringes paler. Beneath fore wings blackish, costa with two or three dark spots and about an equal number of light ones. Veins at outer margin prominently margined with buff-coloured scales. Hind wings somewhat lighter than above, veins as on fore wings. The ♂ differs in having the colouring much less pronounced, the basal space being largely encroached upon and obscured with blackish, the median vein being black. Hind wings lighter above and both wings very much lighter below. Types 1 pair in my collection from Huachuca Mts., Arizona.

Euhyatira Superba, n. sp.

♂ expanse 1⅝ inches. Head and thorax light brown with a purplish tinge, the latter marbled with lighter purplish shades. Abdomen yellowish fuscous, tufted. Palpi yellowish, externally darker, terminal joint dark fuscous. Tongue yellow. Fore wings brownish, costa somewhat shaded with black, ordinary markings indistinct. T. p. line double, lunulate, obscured at costal end by the dark shade. T. a. line black, indefinite. Reniform ovate, erect, brown centred, lighter ringed, not prominent. Orbicular a small scarcely discernible yellowish spot. Veins lightly shaded with black a short distance on either side of t. p. line. Fringes yellow with a darker yellow basal line. Terminal line dark, lunulate, cutting fringes along veins. The lunules are filled with ground colour in centre of wing, becoming more yellowish towards apex and internal angle. Pinkish white scales line the excavations of the terminal line, lightly towards apex, scarcely discernible at middle of wing and prominently so towards inner angle. There are five large, prominent, sharply-defined light-coloured spots on the wing. These are more or less completely ringed with white and filled with shades of pink and yellowish brown. The basal one is largest, extending completely across wing and outwardly to t. a. line, the course of which it follows

The upper portion is filled with shades of pink and white, the lower by a double yellowish blotch. At the middle of the inner margin is a subquadrangular brownish spot, bordered above and to outer side with white. The spot at inner angle is oval, the lower edge cut squarely off by inner margin. Apical spot ovate, pink-filled, little or no trace of brown, white bordered along inner edge and inner portion of lower. The fifth spot is on costal edge, just within the apical, with which it is connected by a narrow white dash running from the middle of the costal to lower edge of apical, it is round, filled with yellowish brown and entirely bordered with pinkish white. There are one or two minute white points on costa between the two spots. Hind wings dark fuscous, fringe lighter, a faint narrow, lighter median band. Beneath wings yellowish white, spots of upper surface faintly discernible. Legs quite thickly coated with hair of a light purplish-yellow colour. Type 1 ♀ in my collection from Huachuca Mts., Arizona. Kindly presented to me by my friend, Mr. Poling.

Feralia Brillians, n. sp.

Ground colour a brilliant grass green, ordinary lines black, shaded with white. Front vertex and collar green, varying in shade in different specimens, but in all lighter than thorax. Patagiæ and thorax dark green, the former fringed with whitish, as is also the thorax posteriorly. There is a fine black line at base of collar and some black hairs scattered along the patagiæ next to the white margin. At base of thorax there are also black hairs,which are apparently clustered into two or three tufts, but this may have been caused by the pins. Abdomen bronze brown, the anterior edge of segments fringed with green. Beneath whitish, except at tip, which is black. Thorax beneath pale greenish white, as are also the legs, except the tarsi, which are ringed with black and yellowish white. Antennæ fuscous above, yellow beneath. Palpi blackish externally, yellowish internally. Tongue yellow. Fore wings darker and lighter shades of the same tint of green, beautifully variegated by the bright black lines and white shades. Basal half line black, distinct, narrowly shaded with white externally. T. a. and t. p. lines strongly convergent at inner margin and connected by a short black dash just before reaching it. T. a. line black, heavy, general direction strongly outwardly oblique, irregularly scalloped. In one specimen it is more or less broken. Prominently shaded with white internally. T. p. line regularly scalloped, curved widely around cell, then nearly in a direct line to inner margin very

close to t. a. line, rather narrowly shaded with white externally. S. t. line black scalloped, inclined to be fragmentary, especially heavy at costa and just before reaching inner margin. Costa inclined to be lighter than ground colour, especially outer half, dotted with black. Orbicular large, round, bordered by a fine black line, within which is a narrow white shade, centre filled with green. Reniform large, upright, constricted, black ringed, a white ring lining the black encroaches largely on the green filling, dividing it into an upper and a lower patch. Fringes whitish, checkered with bronze between the veins. At the inner angle the check extends through the terminal space to the s. t. line, forming a conspicuous quadrangular bronze patch. Hind wings white, tinged with pale green outwardly, a few dark scales at inner angle. Fringes checkered white and pale green. Beneath pale greenish, lower portions of both wings lighter, markings of upper surface traceable. There is a rather prominent patch of dark scales on costa at inception of s. t. line, and in some specimens indications of one or two other costal patches. Types 2 pair in my collection. Huachuca Mts., Arizona.

TABLE TO SEPARATE THE GENERA AND SUBGENERA OF COCCIDÆ RELATED TO LECANIUM.*

BY T. D. A. COCKERELL AND P. J. PARROTT.

The following table of the forms related to *Lecanium* must be regarded as provisional, pending a thorough study of the different stages of the now very numerous described species. Certain species will be found not to fit into the table at all, but we defer the proposal of new generic names for them, pending further studies:

1. Female flat or slightly convex, legs and antennæ slender, normal... 5.
2. Female convex, usually hemispherical, hard when mature; legs and antennæ slender, normal.....6.
3. Female more or less spherical, closely resembling *Kermes*.....7.
4. Female not so; or antennæ and legs wanting or more or less rudimentary 8.
5. Female with marginal hairs: body soft, moderately convex....*Calymnatus*, Costa.

 Female with marginal hairs; skin hard, with large tessellations.....*Eucalymnatus*, Ckll., n subg. (Type *Lecanium tessellatum*, Sign.)

 Female with marginal fan-shaped scales.....*Paralecanium*, Ckll.

*A continuation of the tables in CANAD. ENTOM., Nov., 1899, p. 333. This part completes the Lecaniinæ.

6. Skin microscopically tessellated; holarctic group.. *Eulecanium*, Ckll.
 Skin with polygonal areas containing pits; tropical group.....*Saissetia*, Déplanches.
7. Male scale of the *Lecanium* type; holarctic group.....*Physokermes*, Targioni.
 Male scale subcylindrical, felted, with a glassy operculum; Australian....*Cryptes*, Crawford.
8. Adult female only moderately convex; antennæ short, tapering from a broad base; subterranean form of the holarctic region.....*Lecanopsis*, Targioni.
 Not so.....9.
9. Adult female covered with a more or less distinct glassy test; skin crowded with large glands..*Neolecanium*, Parrott, n. subg. (Type *Lecanium imbricatum*, Ckll.)
 Not so.....10.
10. Mentum of female prolonged, forming a transversely corrugated sheath..... *Myxolecanium*, Beccari.
 Mouth-parts normal.....11.
11. Larva greatly elongated, with parallel sides; adult female without legs or antennæ.....*Aclerda*, Signoret.
 Larva otherwise; female very convex 12.
12. Adult female dark red-brown, very convex, abdominal region conspicuously segmented; antennæ short and thick, 6-jointed; legs very short, rudimentary; Australian....*Alecanopsis*, Ckll., n. gen. (Type *A. filicum* = *Lecanopsis filicum*, Mask., 1893.)
 Adult female not thus segmented; American..... *Toumeyella*, Ckll.

SOME EXPERIMENTS IN THE EXPORTATION OF BENEFICIAL INSECTS.*

BY F. M. WEBSTER, WOOSTER, OHIO.

I do not wish by this title to imply that there is not to be another phase to this experiment, but owing to climatic differences between Ohio and South Africa, whereby our winter months are their summer months, the export side of the problem came first. Next autumn, in South Africa, but spring with us, the tide of transportation will set in in the other direction.

Mr. Chas. P. Lounsbury, Colonial Entomologist at Cape Town, South

* Read before the Ohio State Academy of Science, Dec. 26, 1900.

Africa, visited me last summer, and, together, we perfected plans looking to the transportation of large numbers of our native Ohio Coccinellidæ to his country, with the hope of colonization there. It is but fair to say that when my former assistant, Mr. C. W. Mally, left me a year ago to take a position as Mr. Lounsbury's assistant, we planned something of the sort to be submitted to him by Mr. Mally after reaching Cape Colony, but not then expecting to be able to complete the arrangement with Mr. Lounsbury himself in Ohio.

The first consignment consisted of several hundred individuals belonging to the following species: *Megilla maculata*, *Hippodamia parenthesis*, *Cocinella 9-notata*, with scattering individuals of *H. convergens* and some *C. sanguinea*. This consignment was forwarded about the middle of October. Under date of November 14, 1900, Mr. Lounsbury writes me from Cape Town as follows: It is my pleasant duty to inform you how the Coccinellids arrived. The *Coccinella 9-notata* carried best, and fully nine-tenths of them were ready to feed. *Hippodamia parenthesis* carried next best, with say 20 per cent. mortality. The *Coccinella sanguinea* were about half of them dead, and the *Megilla maculata* about three-fourths dead.

A considerable number of *Pentilia misella*, a minute, black species, which feeds on the San José scale, were collected about Mentor, Ohio, by my assistants, and these were sent to Mr. Lounsbury at Boston, to be reshipped by him to South Africa. Most of these succumbed before reaching Boston, and were all dead when received at Cape Town. On October 27, however, I sent a lot of some 800 individuals of this last species to Cape Town direct, and a note from Mr. Lounsbury, dated December 4, informs me that the little fellows arrived in good shape, with lots of live beetles, and enough to start a large colony. How successful we shall be in getting these Lady beetles permanently established in their far-off home remains yet to be learned.

The beetles are collected and placed in a tin box without food, and the box filled with bits of crumpled paper. The package is sent to a gentleman in New York City, so as to reach him not later than Tuesday morning. They are at once taken to the steamer and placed in a refrigerator, and the Colonial Agent in London informed of their arrival when the steamer lands at Southampton, England. A messenger is at once dispatched to Southampton and gets the package, and sees it placed in the refrigerator of a steamer bound for Cape Town, where they are promptly delivered to Mr. Lounsbury.

PERSONAL.

PROF. W. G. JOHNSON, State Entomologist of Maryland, has resigned this position in order to undertake the editorship of the *American Agriculturist;* he enters upon his new duties at the beginning of this month. His address is at the office of the *American Agriculturist*, 52 Lafayette Place, New York.

His resignation will be a very great loss to the Agricultural College of Maryland, and to the farming and horticultural interests of the State. His scientific knowledge of entomology and his practical application of it to husbandry and fruit-growing, combined with his untiring energy and boundless enthusiasm, have rendered his services as State Entomologist of more than ordinary value. His work in connection with the use of hydrocyanic acid gas as an insecticide is especially noteworthy. It is to be hoped that he will not entirely drop out of the ranks of economic entomologists, but will continue to take an active interest in the progress of this department of the science and its beneficial employment for the welfare of the community.

While we deplore the withdrawal of Prof. Johnson from the active prosecution of economic work in entomology, we are glad to know that he is to fill so important a position as the editor of one of the most influential agricultural publications in America. He will still be able to take a large share in the work of educating his countrymen to realize the importance of a knowledge of insects and their ways, and to carry out in practice for the preservation of their crops the information that has been gained by the careful studies and experiments of those devoted to the pursuit.

We desire to unite with his many friends in the wish that Prof. Johnson may meet with the utmost success in his new position, and be enabled to accomplish much good and useful work of a literary, scientific and practical character.

Mailed February 5th, 1901.

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

MARCH, 1901.

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The Canadian Entomologist.

VOL. XXXIII. LONDON, MARCH, 1901. No. 3

NEW HISTORIES IN HYDRŒCIA.

BY HENRY BIRD, RYE, N. Y.

(Continued from Vol. XXXII., page 283.)

Continuing under this heading, the writer would offer a few remarks subservient to a fuller knowledge of the early stages of this genus, which may be considered supplementary to some former papers that have appeared. There is some discussion at present in the current literature as to whether the term *Gortyna*, Och., should not replace *Hydræcia*, Gn., and it is to be hoped definite conclusions may be reached and the proper one fully established. The following early histories are perhaps unknown, or at any rate remain as yet unpublished.

Hydræcia inquæsita, G. & R.

This is such a widely-diffused and familiarly-known species that it makes it gratifying to expose some traits of its earlier existence. So general was the poor condition of practically all examples previously seen, that the notion of its being a thin-scaled and ill-marked species had gained quite a hold on the writer. With the specimens bred last season, some light has dawned in the matter, and he would hasten to make amends in behalf of such erroneous impressions. For with conditions right, specimens, rich in a full complement of scales and attractive in their warm, red-brown colouring, were plentifully obtained. In making a choice of food-plant, the larva takes an unusual departure and makes a selection among the Cryptogamous plants, namely, *Onoclea sensibilis*, Linn. One would hardly think of associating these borers with a delicate fern, and, as may be expected, it is the roots which serve as a domicile. These latter are a bit peculiar, at least to a novice in botany. Growing slightly below and parallel to the surface, a principal root-stock creeps with rapidity, sending up fronds at various intervals. Its advancing end is green and soft, and it is to this point that the larva extends its burrow, though free access is kept up to the original entrance. An exceedingly dense growth of tough, hairy rootlets, which resembles the curled hair used by upholsterers, draws nourishment for the plant. By the time the larva has reached maturity, the part of

the root first occupied has died and become more or less decayed, and this point is sought for the pupal transformation; quite often the cell containing the chrysalis is formed among the fibrous rootlets. In no case can any exit arrangement be made, and it goes hard with those examples that have to reach daylight by passing through such a tangle. To this condition it seems possible to attribute the preponderance of rubbed specimens which are taken at light or other sources.

It may be remarked that *Hydræcia* pupæ do not attempt to reach the surface or outlet of their burrows by any process of wriggling when about to give up their imago, a circumstance frequently noted among borers in other families. So *inquæsita* must reach freedom as best it may, and generally comes out the worse for wear; the only perfect examples to result from those bred were secured from those last to appear and which had been taken from their natural quarters and were placed on the surface of damp leaf-mould. So long had this species been sought in its larval state, that the ease with which its whereabouts may be known and the flagrant evidence it leaves behind as it first enters the plant make it seem ludicrous that it could have been passed by for so long. One may drive along a country road or even board a trolley car and yet note this species by the wayside. This, however, only applies to a certain season, as later there is nothing to guide one, while a search for the pupæ would be time wasted. About the first of June the young larvæ (presumed to have hibernated in their first stage) enter the frond stem and begin active operations. In a few days the root is reached and henceforth remains the only portion inhabited; in fact, the delicate stem could not long accommodate the enlarging insect. Here the list of casualties begins, as that telltale secret of a hidden larva which appears in the foliage of the plant at this period is as conspicuous to the eyes of its parasitic foes as it can be to human optics. So, a fearful percentage suffer from this source, and many more attain a violent end. *Onoclea*, with true fernlike propensities, is fond of damp places, though less so than many others, and often grows in depressions that are for a time inundated after heavy rains or showers. If we then visit an infested locality which has a low situation, the number of drowned individuals will quite appal us and our hopes of a rich harvest will receive a serious jar.

When first detected, the larva had certainly passed through at least one moult, though it was noted almost as soon as work was begun. At this period it is very delicate and slender, translucent except on the first

four abdominal segments, which are dark, somewhat purplish in hue. Lines on the thoracic joints may be faintly made out, whitish; their continuations on the last abdominal one are less so. An important individual point is that no lines, not even a faint continuation of the dorsal, cross the dark contrasting area shown on the first four abdominal segments. The head and plates are semi-transparent; but little can be made out of the tubercles, though there seems a fair complement of setæ; length .65 inch.

Next stage: The salient characteristics with *Hydræcia* larvæ belonging to this section of the genus are now well exemplified. The abrupt termination of the usual dorsal and subdorsal lines on four of the middle segments leaves this space presenting the contrasting effect of a dark band or girdle, thus making it always easy to distinguish the young larvæ of this group.

Head now measures .06 inch across, a shining honey-yellow colour. Its development is normal, a few minute setæ arise on the front; a black, oblique line at the side, which takes in the ocelli, is the only marking. The thoracic shield is a shining plate as wide as the head and very nearly covers the first segment above the line of the spiracles. It is prominently edged at the lateral borders with black, which finds a continuation on the head in the line above mentioned. The tubercles are hardly definable, though their position is usually indicated by minute setæ. The anal plate is similar to the thoracic in texture, projects outwardly over the last pair of pro-legs and offers a protective shield at this extremity. The usual preceding plates on the last segment are well developed for this early stage. On the segments where they occur the ordinary lines are whitish and so wide as to overbalance the dark body colour. The spiracles are black. Larva now measures .95 inch in length.

Following stage: A marked gain in bulk is noticed, otherwise appearance remains similar. The black side line disappears from the head; the lateral tubercles come into prominence, iv is most noticeable behind the spiracles except on joint ten where it is low down. On the next to last segment i and ii have become much enlarged.

Length 1.10 inches.

Penultimate stage: Head and shields retain their respective proportions, tubercles improminent, i and ii, on all joints but the last, are the merest dots, requiring close scrutiny to observe when unaided by a lens.

The colour has faded toward the conventional translucence of maturity, though there still remains a flush of purple-brown on the first four abdominal segments. Length 1.48 inches.

Mature larva: All traces of the longitudinal lines have disappeared, its shade may perhaps be designated as a translucent flesh colour, lightest on the thoracic joints. The tubercles show no gain in importance, and compared with its congeners are not strongly defined. On the seventh abdominal segment iv is low down below the line of the spiracles, very low down, in fact, and close beside v. Other features remain as before. Head now measures .11 inch across; length of larva 1.65 inches. The actual duration of the various stages was not noted, but the entire time consumed after feeding had begun until maturity is reached was reckoned at about fifty-one days.

The pupa is similar to its allies and agrees with the regulation noctuid type. From being formed in more or less of a cell, it does not show the cylindrical shape of some others which, by reason of the small diameter of their burrows, are so confined as to be unable to assume a truly normal form. It is of the usual shining chestnut brown, with ordinary delineations, armed with a bifidate spur of slender proportions. Length .65 to .80 inch. Pupation occurs about August 20, but the species are in no way regular upon this event. Imagoes appear twenty-eight days later.

It was a matter of some gratification that the specimens bred last season proved to be partly those forms or variations of the imago having the orbicular white-marked. Previous acquaintance with local examples had only encountered those in which the ordinary spots were concolorous, and it seemed possible the species might be subject to some geographical or racial variations where these features might predominate. That this variation occurs indiscriminately and does not bear on geographical lines is slightly important, since the matter of variation in *Hydræcia* is still open to some study, and any fully-established points in evidence offer a help toward final solutions.

Hydræcia limpida, Gn.

This species had never been taken in this locality; in fact, the writer had not been able to secure an example from any source, so that the discovery of its larva and the subsequent acquisition of a good series of imagoes was as great a surprise as it was a pleasure. Like many of its associates which are strictly root-borers, this larva gives but a slight intimation of its whereabouts, and one is indebted to some chance incident

for its discovery. The food-plant is *Veronica virginica*, which grows sparingly in this section, and although a borer may have attained maturity in its principal root, there is often no evident deterioration of growth. Sometimes, however, the mature larva will have consumed so much of the root at its crown, to provide itself with more commodious quarters, that the stock will have died and become blackened, thus standing a mute sentinel to all who are apprised of its secret. The young borer enters the stem slightly above the ground level, where a small opening is made, furnishing air and an outlet for accumulations which would otherwise clog the gallery. Free access is kept up to this point until maturity, even though the widely-extending roots permit the larva to bore a foot or more in various directions. The roots are small for the habitation of such a guest, and it is the extended mining which they do that often results in the destruction of a specimen when the larvæ are sought for transference to the breeding cage. One never knows at what point to expect his quarry, and a fatality often occurs. Aside from this the species seemed to thrive very peacefully. The change to pupa appears to be made in the neighboring soil, and the gallery is not used as an exit by the moth, though this point has not been settled definitely, since no pupæ were obtained in the field. Larvæ were encountered in second stage from the last. They were quite as easily recognized as belonging to *Hydræcia* as the preceding, having the usual characteristics well in evidence. The colour is a pale, sordid sienna; the lines dirty white; plates not strongly defined and the tubercles less so. Specimens were so scarce that this period was insufficiently observed.

Penultimate stage: Inflates were now secured and definite notes taken. This next to last stage is the most important in making comparisons in this genus, as the individuality fades later into a very general translucence, though of course the tnbercle arrangement and structural details still point to their specific attributes.

Larva now shows some points in common with its near ally *cerussata*, though the size and colour are quite dissimilar. On the thoracic joints the skin is puckered or creased, so as to appear slightly contorted, and all tubercles or plates are well defined; the anal plate, however, does not show the departure occurring with its ally.

Head measures .08 inch; regular, smooth and shining; of a honey-yellow colour, the mouth-parts alone showing tipped with brown; there seems a full complement of setæ, but the side or ocellar line is wanting.

Body is slender, of the usual cylindrical build, the constrictions of the thoracic regions are already noted. Colour as in earlier stage, a pale sienna, in some specimens showing rather pink on the first four abdominal joints. This area is not crossed by the longitudinal lines. These latter are whitish; on the thoracic segments they are rather confused, their continuation on the rear abdominal ones shows well-defined and regular. Thoracic shield a little wider than the head, of the same shining, corneous texture, edged faintly at the sides with brown; anal plate is similar, smooth and shining, its setæ of usual prominence. The tubercles are all well defined, of an umber shade, iv the largest of the lateral ones. On joints two and three, iii, iv and v are clustered in their triangular setting, and by reason of their large size, especially iv, almost touch one another. On all segments but the next to last, i and ii are small, as is customary, and show somewhat darker. On joint eleven these are very large and placed in quadrangular form. The plates preceding the anal one are barely cut in twain by a thread of the dorsal line. The spiracle on joint one is most conspicuous by reason of the lighter colour of this segment, and it is entirely black. The other spiracles show a light centre and have their elliptical margin ringed with black. On the seventh abdominal segment there are five tubercles clustered around the spiracle. What had previously been considered as a raising of iv, in some cases, to the upper corner of the spiracle, seems now very plainly the acquisition of an accessory tubercle at this point, the normal iv all the while retaining its usual position on this segment, lower down. But this additional one is as fully developed as iv is on this or the preceding joints, and its placing corresponds identically with the arrangement as occurring on joints four to eight. With two other species this additional tubercle first appears in this penultimate stage, iv previously occupying its lower position and remaining unchanged after entering the stage, the additional tubercle now appearing, but causes no alteration with the normal iv. We may designate this acquisition as iv a, looking upon its arrival in the same light as the other cases cited, though observations with *limpida* were insufficient to say at what time it was acquired. Larva now measures 1.38 inches.

Final stage: There appears no structural change from the preceding period. The lines disappear, a flesh-coloured translucence is now the tint. The spiracles, tubercles and true-legs are all black; the shields are unchanged. Length 1.63 inches. Larvæ attain full growth by August 19.

The pupa is formed in the adjoining soil, at least this happened with the examples in confinement. It shows no departure from the usual form, agreeing very well with the preceding species. Length .90 inch.

No larval history so far encountered has been quite so satisfactory to the writer, nor possibly of greater general importance than this meeting with *limpida*. From the date of its first conception a certain haziness existed regarding the species. Guenée himself was not sure of its distinctness, though his fear of its being a variety of *marginidens* or *nebris*, simply because they were all white-spotted forms, has proved to be groundless. Prof. Grote sees it in another light, and in naming his *cerussata*, pauses over the matter lest his newer term might be simply a more robust form of the Guenée species. Yet the differentiation has proved correct. With the recent "Revision," by Prof. Smith, and the more abundant material of this later date, the specific distinctness of the two are not questioned by him, though there seems no strong line to be drawn between the two.

Adding to this the many queries received from all sides, makes it seem worth while devoting a word in these pages to descriptive detail, since the literature is in no way burdened with a reference to this species. An eminent lepidopterist long ago gave me a translation of the original description, which is as follows: "♂ 26 mil., ♀ 40 mil. Fore wings very entire, of a deep brownish black with traces of ordinary lines. Subterminal line marked at apex by a vague yellowish point. Reniform white, divided by brown threads and shaded centrally with yellowish; the three outer spots white like the preceding species (marginidens), nearly even. Hind wings similar in both sexes, whitish, a little transparent, with external margin and veins brownish. Beneath the four wings gray, powdered with brown, with dark mesial lines. Thorax gray, no white spots at the base of the primaries. Illinois; Coll., Doubleday."

Fresh examples of *limpida* are beautiful insects indeed; there is a certain violet tint pervading its colouring, which, unfortunately, soon fades, and the contrasting white spots tempered by a fleck of cream, together with an exceedingly trim appearance, quite captivate one upon first meeting the species. The mention of the hind wings being "whitish, and a little transparent," should not be misleading, as they are in fact much less smoky than *cerussata*, more silky, and with worn or badly-faded material could easily be construed into a certain semi-transparency. The salient feature of the description is the remark noting the absence of any

white in the basal area. Rye specimens are plainly typical in this respect, for this latter feature is somewhat a departure from the general rule and at once becomes noticeable. In the "Revision," specimens having a white basal line or a few whitish scales here, together with a more reddish tinge of the median field, are described and show to some extent how to gauge our conception of its variation.

But this is along the conventional lines upon which variation occurs in the group. The prevalence or absence of white in the basal area, the orbicular, claviform and reniform spots, and finally in the scales at the base of the antennæ, is not a point by which any very rigid rule can hold. Examination of a good series of any of the allied species will soon show this, yet individually this variation is not so great—it is in the mixing of the species wherein results confusion. Perhaps the greatest point of specific constancy as we glance superficially at a collection, though apparently a very insignificant matter, is the general hue or tint of the body vestiture (applicable only with fresh specimens), and secondly, the wing outline is important. But, fortunately, we are not dependent on conceptions of varying shades and colours, since individual opinions differ in such matters and colour-blindness exists to a wide degree—rather may we rejoice that these closely-related species cannot always mystify us, but in their larval stages show departures easy of recognition.

The unravelling of these early histories seems necessarily a slow task and one which often brings the student under, to him, an amusing criticism, since it becomes so necessary to dig and delve in such a varied number of locations—be it the side of the village turnpike or a neglected corner of a country churchyard—and one frequently hears the passer-by remark upon the sad affliction of being "slightly touched on the subject of bugs and all that." But with success as a reward to our efforts, such remarks only elicit a smile, and we are well satisfied indeed if we have but found our quarry.

THE THIRTY-FIRST ANNUAL REPORT of the Entomological Society (1900) has just been published by the Ontario Department of Agriculture. In its pages will be found many articles of an interesting and important character, dealing for the most part with entomological subjects of a practical nature.

THE GENERAL INDEX to the Thirty Annual Reports, 1870 to 1899, is now on sale by the Society. Price (including postage): unbound, 25 cents; bound in black cloth, 50 cents.

SOME PLANT-LICE AFFECTING PEAS, CLOVER AND LETTUCE.

BY E. DWIGHT SANDERSON, NEWARK, DEL.

(Continued from page 39.)

LETTUCE APHIDS.

Nectarophora lactucæ, Walk.

(Pl. III., 8.) Several writers have listed *S. lactucæ*, Kalt. as an American species. That of Thomas is noted below. Dr. J. B. Smith gives the species in his Insects of New Jersey. Whether the species occurs in this country or not is open to question. It should be noted here that Kaltenbach's *Aphis lactucæ* is a *Rhopalosiphum*. Buckton gives both *Siphonophora lactucæ*, Kalt. and *Rh. lactucæ*, Kalt., though Kaltenbach described but one species. Walker (Ann. and Mag. Nat. Hist., Ser. 2, p. 49, 1849) in his description of the species confused it with *Rh. lactucæ*, Kalt., as Passerini has pointed out. Walker described it as *Aphis lactucæ*, Linn. and as a synonym of *A. lactucæ*, Kalt., though Kaltenbach had already shown *A. lactucæ*, Linn. to have been invalid, and that his species was entirely distinct. Walker also gives *A. ribis-nigri*, Mosley (Gard. Chron. I., 684) as a synonym. Mosley's description is hardly recognizable, but evidently is the same as some of the varieties described by Walker, both undoubtedly referring to *Rhopalosiphum ribis*, Linn., and *Myzus ribis*. Unfortunately, Walker describes only the coloration of his species. Part of his species is evidently, however, *N. lactucæ*. Passerini's description is too brief to be recognizable, but probably refers to the same species, as Buckton thought. Why Buckton described the species as *S. lactucæ*, Kalt., is not clear. Buckton follows Walker in giving *Ribes nigrum* and *grossularia* as food-plants, and remarks that Walker states that the cornicles are enlarged at the middle, but does not otherwise seem to confuse the species with others as did Walker. Mr. Buckton has kindly loaned me specimens which correspond very closely with his description. The slide is labelled, "(18) A. R. *Siphonophora lactucæ*," and "*S. lactucæ*, Walk." They are as follows:

Winged Viviparous Female.

Length, 2.32 mm.; width, 0.82 mm.; antennæ, 3.10 mm.; III., 0.73 mm., IV., 0.50 mm., V., 0.41 mm., VI., 0.12 mm., VII., 1.11 mm.; Tibia, I., 1.35 mm., II., 1.45 mm., III., 1.85 mm.; Cauda, 0.19 mm.;

Cornicles, 0.50 mm.; Wing expanse, 7.50+mm.; Beak extending to mesocoxæ.

Antennæ dark, III. and IV. with sensoria, hairs capitate; legs light, tips of femora and tibia, and tarsi dark, some of hairs on legs capitate; cornicles straight, cylindrical, reaching to or slightly beyond tip of cauda, darkish at bases and tips, cauda dark; lateral edges of abdomen with black spots, abdominal segments banded and irregularly marked with dark, bases of setæ in lateral spots and of two dorsal setæ on caudal segments, large and conspicuous. Two specimens.

Apterous Viviparous Female.

Length, 2.5 mm.; width, 1.30 mm.; antennæ, 2.65 mm.; III., 0.63 mm., IV., 0.48 mm., V., 0.38 mm., VI., 0.10 mm., VII., 0.92 mm.; Tibia, I., 1.2 mm., II., 1.35 mm., III., 1.70 mm.; Cauda, 0.28 mm.; Cornicles, 0.57 mm.; Rostrum extending to between meso- and meta-coxæ.

Antennæ light, joints, tip of V., VI. and VII. dark, III. with sensoria, abdomen unmarked. One specimen.*

This species is readily distinguished from the allied American *Nectarophora* described above by the sensoria on IV. of the antennæ of the winged female, and by the larger number (12 or so) of sensoria on III. of the apterous female.

Kaltenbach and Buckton both consider *S. lactucæ*, Koch., as probably *S. sonchii*, Linn.

Rhopalosiphum ribis, Koch., is probably *Myzus ribis.*

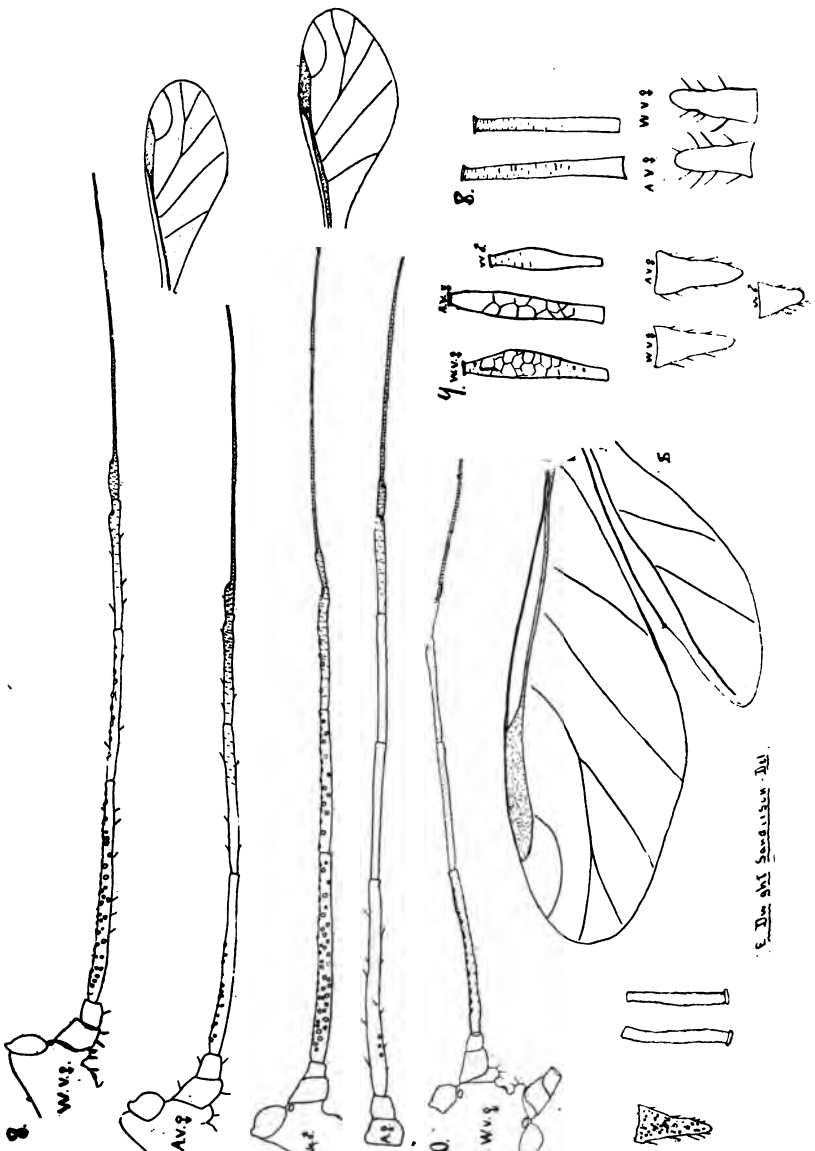
Rhopalosiphum lactucæ, Kalt.

(Pl. III., 9.) This species was taken October 27, 1899, on *Sonchus oleraceus* at Newark, Del., in large numbers, and was kindly determined by Mr. Th. Pergande. It corresponds closely to Buckton's description. Many of the nymphs and pupæ were pink. No search was made for the sexes at the time, but several males have been found in the preserved material. No oviparous females were found, and apterous females were scarce. The males and winged females seem to be almost absolutely alike in size and markings.

Winged Male.—Length, 2.20 mm.; width, 1.00 mm.; antennæ, 2.95 mm., III., 0.71 mm., IV., 0.51 mm., V. 0.46 mm., VI., 0.12 mm., VII.,

* The number of specimens mentioned under each species refers to the number of perfect specimens from which the description was drawn; a much larger number are preserved of most of them.

CAN. ENT., VOL. XXXIII. PLATE 3.



1.20 mm.; Tibia, I., 1.25 mm., Cauda, 0.21 mm.; Cornicles, 0.34 mm.; III., IV. and V. with numerous sensoria. Two specimens.

Winged Viviparous Female.—Length, 2.56 mm.; width, 1.00 mm.; antennæ, 2.75 mm., III., 0.74 mm., IV., 0.50 mm., V., 0.40 mm., VI., 0.12 mm., VII., 0.84 mm.; Tibia, I., 1.10 mm., III., 1.66 mm.; Cauda, 0.28 mm.; Cornicles, 0.44 mm.; III., IV. and V. with numerous sensoria. Five specimens.

Apterous Viviparous Female.—Length, 2.7 mm.; width, 1.30 mm.; antennæ, 2.55 mm., III., 0.72 mm., IV., 0.47 mm., V., 0.33 mm., VI., 0.11 mm., VII., 0.84 mm.; Cauda, 0.29 mm.; Cornicles, 0.53 mm; Rostrum extending to mesocoxæ; two or three sensoria on III. Three specimens.

Myzus Pergandii, n. sp.

Winged Viviparous Female. (Pl. III., 10., Fig. 5.)

Wing expanse, 7.00 mm.; length, 1.69 (1.25–2.00) mm.; width, 0.71 (0.50–0.85) mm.; antennæ, 2.07 (1.60–2.10) mm., III., 0.52 (0.40–0.60) mm., IV., 0.43 (0.30–0.46) mm., V., 0.30 (0.24–0.34) mm., VI., 0.15 (0.14–0.16) mm., VII., 0.56 (0.42–0.62) mm.; Tibia, I., 0.96 (0.70–1.10) mm., II., 0.94 mm., III., 1.28 (1.00–1.50) mm.; Cauda, 0.19 (0.15–0.23) mm.; Cornicles, 0.36 (0.28–0.40) mm.

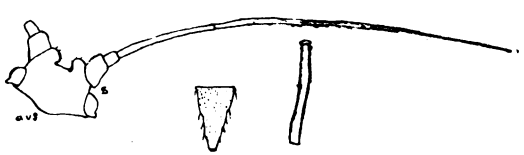


FIG. 5.—*Myzus Per andii*, n. sp.: Antenna, cauda and cornicle of apterous viviparous female.

Head, antennæ, thoracic dorsal, lateral, and ventral sclerites, distal half of femora, tips of tibia, tarsi, and cornicles, black; membrane of thorax brownish, as are legs; abdomen dirty white, marked with three large lateral blackish spots in front of cornicles, a large dark spot dorsally covering segments three, four, and five, with two lateral branches on either side, segments six and seven dark, eight light with small dark band, cauda and ventral plates dark, eyes black; small brown ring at base of III. (antennal segment), 12 to 15 sensoria on III.; stigma brown, slightly smoky. Twelve specimens.

Apterous Viviparous Female.

Length, 1.85 (1.50–2.10) mm.; width, 1.05 (0.90–1.10) mm.; antennæ, 1.80 (1.75–2.20) mm., III., 0.48 (0.40–0.64) mm., IV., 0.37 (0.35–0.41) mm., V., 0.25 (0.20–0.32) mm., VI., 0.13 (0.10–0.15) mm., VII., 0.45 (0.38–0.54) mm.; Tibia, I., 0.81 (0.70–1.00) mm., II., 0.83 (0.70–1.00) mm., III., 1.15 (0.93–1.40) mm.; Cauda, 0.20 (0.16–0.22) mm.; Cornicles 0.50 (0.48–0.60) mm.; Rostrum extending to mesocoxæ. Eyes, tips of cornicles, and tarsi black, otherwise pure whitish, with indistinct greenish mesal stripe on abdomen, sometimes with a few capitate hairs on caudal segments, tibia, and head; no lateral tubercles; antennæ lie flat over back when at rest, and the gibbous tubercles are thus bent upwards. Thirteen specimens.

This species is closely allied to *M. achyrantes*, Monell (*M. malvæ*, Oest.), as described by Monell and Oestlund. The apterous females are distinguished from it by the longer antennæ, which are whitish, eyes black instead of red-brown, and abdomen whitish instead of pea-green as in *malvæ*. The winged female is distinguished by having the inner angles of I. straight or but slightly rounded, VII. slightly longer than III., and cornicles black. The apterous females are very similar to *Siphonophora calendulella*, Monell, but the description of that species is too brief to be recognizable. Monell mentions that a species closely allied to *S. achyrantes* occurs on lettuce.

The winged females bear a resemblance to *Rhopalosiphum dianthi*, Schr., but are smaller, the cornicles are not swollen and are black, and only III. bears sensoria, while Oestlund describes the winged *dianthi* as having sensoria on III., IV. and V.

Specimens of this species were kindly loaned me by Prof. W. G. Johnson, from Baltimore Co., Md., collected on lettuce, February, 1899; were found by me on garden peas, November 1, 1900, at Newark, Del., and were collected by Prof. G. H. Powell, May 3, 1897, on eggplant under glass—to which they were doing considerable injury—at the same place.

The description given by Thomas under *Siphonophora lactucæ*, Kalt., refers either to this species or *M. achyrantes*, Monell.

Types deposited in the U. S. Nat. Museum. Type No. 5422.

EXPLANATION OF PLATES.

Plate II. (page 34).

1. "*Siphonophora pisi*," from G. B. Buckton.

2. "*Siphonophora pisi* (?)," from G. B. Buckton.
3. (*Nectarophora destructor*, Johns.)
4. *N. pisi*, var. *reticulata*.
5. *N. pisi*, var. from Iowa:

A, apterous viviparous female; W, winged viviparous female; M, male; a, antenna; ca, cauda; cl, cornicle; wg, wing; sp, spring.

(From camera lucida drawings by the author.)

Plate III.

8. "*Siphonophora lactucæ*, Walk.," from G. B. Buckton.
9. *Rhopalosiphum lactucæ*, Kalt.
10. *Myzus Pergandii*, n. sp.

(From camera lucida drawings by the author.)

CICADIDÆ — AMERICAN GENERA AND SPECIES.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The following bibliographical catalogue was prepared several years ago, and thinking that other workers might find it of use, it is offered for publication at this time. A table of the genera, compiled from the writings of various systematists who have dealt with this family, is added to make the paper more complete.

TABLE OF GENERA.

A. Lateral margins of the pronotum not angulately dilated.
 b. Basal abdominal segment of the male not expanded or dilated above so as to conceal the timbal or drum; the operculum usually rudimentary or wanting.
 c. The ulnar* veins coalesced at base; tegmina with eight apical cells *Melampsalta*, Kol.
 cc. The ulnar veins not coalesced at base.
 d. The first apical cell of the tegmina distinctly longer than the second *Tibicen*, Latr.
 dd. The first and second apical cells of tegmina equal.
 e. Costal margin of the tegmina very convex; second ulnar cell large and triangular; the posterior wings with six apical cells *Platypedia*, Uhl.

*See Stal, Hemip. Afr., IV., p. 264, for terminology of wing veins.

ee. Costal margin of the tegmina only very slightly convex.
f. The posterior wings with four apical cells*... *Prunasis*, Stal.
ff. The posterior wings with five apical cells..... *Calyria*, Stal.
bb. Basal abdominal segment of the male expanded or dilated above so as to conceal the timbal; the operculum well developed.
c. The cross-vein at the base of the second apical cell of the tegmina not oblique, forming right angles with the longitudinal veins..... *Proarna*, Stal.
cc. The cross-vein at the base of the second apical cell oblique, forming angles greater or less than a right angle with the longitudinal veins.
d. The postcostal marginal and the postcostal ulnar veins not parallel, more distant towards the apex.
e. Metasternum not at all or slightly elevated at middle, elevated part not produced in front at middle..... *Tympanoterpes*, Stal.
ee. Metasternum transversely elevated, elevated part longitudinally impressed, slightly produced in front, the produced part truncate or sinuate... *Fidicina*, A.-S.
dd. The postcostal marginal and the postcostal ulnar veins parallel, not more distant towards the apex.
e. Basal area of the tegmina rarely twice as long as wide; apex of the clypeus truncate or subsinuately truncate *Cicada*, Linn.
ee. Basal area of the tegmina twice as long as wide; apex of the clypeus subacuminate or very slightly rounded *Tettigia*, Kol.
AA. Lateral margins of the pronotum angulately dilated.
b. Ulnar veins contiguous at base, interior ulnar area narrowed at base..... *Zammara*, A.-S.
bb. Ulnar veins distant at base, interior ulnar area with its sides subparallel..... *Odopoea*, Stal.

*Stal is not consistent regarding the number of apical cells in this genus; in his original description, Rio Jan. Hem. Faun., II., 22, he says, "*Alae areolis apicalibus quattuor*, and in Hemip. Africana, IV., 9, says, *Alis areis apicalibus sex*, while Ashmead, Entomol. Amer., IV., 141, says, "Elytra with 4 apical cells."

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Tettigetta, Kol.
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parvula, Say.

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Habitat—Missouri, Georgia, Illinois, Kansas, Gulf States, Tennessee, Louisiana, Texas, Nebraska, North Carolina.

PLATYPEDIA, Uhler.

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Habitat—Colorado, Utah, Nevada.

minor, Uhl.

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Habitat—Southern California.

PRUNASIS, Stal.

1861. Stal, Bidr. Rio Jan. Hem. Faun. II., 22.

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venosa, Uhl.

1888. *Prunasis*, Uhler, Ent. Amer. IV., 82.

Habitat—Texas.

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Blaisdelli, Uhl.

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Habitat—California.

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Habitat—Ontario, Canada.

cruentifera, Uhl.

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Habitat—Nevada.

cupreosparsa, Uhl.

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Habitat—California.

hesperia, Uhl.

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‡ *hesperina*, Worth.

1888. *Tibicen*, Woodworth, Psyche, V., 68. = *rimosa* Say.

Habitat—Colorado, Nevada, California.

rimosa, Say.

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noveboracensis, Em.

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Habitat—Missouri, Arkansas, Utah.

septendecim, Linn.

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striatipes, Hald.

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Habitat—Utah.

synodica, Say.

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Habitat—Colorado, Illinois.

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Habitat—Mexico, Texas.

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Habitat—Texas, Arizona.

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gigas, Oliv.

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triupsilon, Walk.

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consonans, Walk.

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sibilatrix, Berg.

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Habitat—Rio Grande Region of Texas, Mexico, West Indies, South America.

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Habitat—Southern Texas, Mexico, Brazil.

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1866. Stal, Hemip. Africana, IV., 6.

aurifera, Say.

1825. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. IV., 332.
1859. *Cicada*, LeConte, Comp. Writ. Say, II., 252.
1888. = *marginata* Say, Woodworth, Psyche, V., 68.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.
Habitat—Konza Indian Settlement, ? Nebraska.

biconica, Walk.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 120.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.
Habitat—Florida, West Indies, Mexico.

bicosta, Walk.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 112.
1881. *Cicada*, Distant, Biol. Cent. Amer. Homop. 7 ; pl. III., 1.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 154.
Habitat--Key West, Florida ; Costa Rica, Mexico, Lower California.

canicularis, Harris.

1841. *Cicada*, Harris, Ins. Inj. Veget., 175.
1862. *Cicada*, Harris, Ins. Mass., 217 ; fig. 88.
1854. *Cicada*, Emmons, Nat. Hist. N. Y. Ent., 152 ; pl. IX., 3.
1856. = *tibicen* Linn , Fitch, Rept. Inj. Ins. N.Y. III., 367.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 151.
Habitat—East Rocky Mountains.

cinctifera, Uhl.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 156.
Habitat—New Mexico, California.

dorsata, Say.

1825. *Cicada*, Say, Journ. Acad. Sci. Philad. IV., 331.
1859. *Cicada*, LeConte, Comp. Writ. Say, II., 252.
1888. *Cicada*, Woodworth, Psyche, V., 68.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 152.
Robertsonii, Fitch.
1855. *Cicada*, Fitch, Rept. N. Y. St. Agr. Soc. XIV., 745.
1856. *Cicada*, Fitch, Rept. Inj. Ins. N. Y. I., 41.

1888. = *dorsata* Say, Woodworth, Psyche, V., 68.

Habitat—Missouri, Colorado, Illinois to Texas, New Mexico.

marginata, Say.

1825. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. IV., 330.

1859. *Cicada*, LeConte, Comp. Writ. Say, II., 251.

1888. *Cicada*, Woodworth, Psyche, V., 68.

auletes, Germ.

1834. *Cicada*, Germar, Silb. Rev. Ent. II., 65.

1888. = *marginata* Say, Woodworth, Psyche, V., 68.

resh, Hald.

1853. *Cicada*, Haldeman, Stansbury's Explor. Utah, Append., 369; pl. IX., 17.

1888. *Cicada*, Woodworth, Psyche, V., 68.

sonora, Walk.

1890. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 105.

1892. = *marginata* Say, Uhler, Trans. Md. Acad. Sci., 150.

resonans, Walk.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 106.

1892. = *marginata* Say, Uhler, Trans. Md. Acad. Sci., 150.

literata, Walk.

1850. *Fidicina*, Walker, Cat. Brit. Mus. Homop. I., 91.

1892. = *marginata* Say, Uhler, Trans. Md. Acad. Sci., 150.

figurata, Walk.

1858. *Fidicina*, Walker, Cat. Brit. Mus. Homop., Suppl., 19.

1892. = *marginata* Say, Uhler, Trans. Md. Acad. Sci., 150.

Habitat—New York to Northern Florida, Gulf States. Texas, Arkansas, Missouri, Colorado, Utah.

Montezuma, Dist.

1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8; pl. II., 2.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 154.

Habitat—Texas, New Mexico, Arizona, California, Mexico.

pallida, Dist.

1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8; pl. II., 7.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.

Habitat—Texas, Mexico.

reperta, Uhl.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 177.

Habitat—Florida, North Carolina, Louisiana.

rudis, Walk.

1858. *Fidicina*, Walker, Cat. Brit. Mus. Homop., Suppl., 13.
1881. *Cicada*, Distant, Biol. Cent. Amer. Homop., 8; pl. II., 20.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 154.

Habitat—Eastern Mexico, ? Arizona.

sordidata, Uhl.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 175.

Habitat—Florida.

superba, Fitch.

1855. *Cicada*, Fitch, Rept. N. Y. St. Agr. Soc. XIV., 745.
1856. *Cicada*, Fitch, Rept. Inj. Ins. N. Y. I., 41.
1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 152.

Habitat—Indian Territory, Central Texas, New Mexico.

tibicen, Linn.

1767. *Cicada*, Linnaeus, Syst. Nat. ed. XII., I, 2.
1775. *Tettigonia*, Fabricius, Syst. Ent., 679.
1794. *Tettigonia*, Fabricius, Ent. Syst, IV., 18.
1803. *Tettigonia*, Fabricius, Syst. Rhyng., 35.
1850. *Fidicina*, Walker, Cat. Brit. Mus. Homop. I., 94.
1869. *Cicada*, Stal, Hemip. Fabr. II., 6.

lyricen, DeG.

1778. *Cicada*, DeGeer, Ins. III., 212; pl. XXII., 23.
1850. =*tibicen* Linn., Walker, Cat. Brit. Mus. Homop. I., 94.

variegata, Fabr.

1794. *Cicada*, Fabricius, Ent. Syst. IV., 19.
1803. *Tettigonia*, Fabricius, Syst. Rhyng., 37.
1830. *Cicada*, Germar, Thon. Ent. Archiv. II., 4.
1869. *Cicada*, Stal, Hemip. Fabr. II., 116.
1892. =*tibicen* Linn. Uhler, Trans. Md. Acad. Sci., 149.

opercularis, Oliv.

1790. *Cicada*, Oliver, Enc. Meth., 749.
1869. =*tibicen* Linn., Stal, Hemip. Fabr. II., 6.

pruinosa, Say.

1825. *Cicada*, Say, Journ. Acad. Nat. Sci, Philad. IV., 330.
1859. *Cicada*, LeConte, Comp. Writ. Say, II., 251.
1856. =*tibicen* Say, Fitch, Rept. Inj. Ins. N. Y. III., 367.
1889. *Cicada*, Provancher, Petite Faun. Ent. Canad. III., 211.

‡*brunneosa*, Wild.

1852. *Cicada*, Wild, Ann. Soc. Ent. Fr. (2), V., Bul. XVIII.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop., Suppl., 20.

1892. =*tibicen* Linn., Uhler, Trans, Md. Acad. Sci., 149.

Habitat—North America.

transversa, Walk.

1850. *Cicada*, Walker, Insecta Saunders. Homop., 15.

alacris, Stal.

1864. *Cicada* Stal, Stett., Ent. Zeit. XXV., 62.

1892. =*transversa* Walk., Uhler, Trans. Md. Acad. Sci., 155.

Habitat—Texas, Mexico.

vitripennis, Say.

1830. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. VI., 236.

1851. *Cicada*, LeConte, Comp. Writ. Say, II., 372.

1892. *Cicada*, Uhler, Trans. Md. Acad. Sci., 153.

‡*albipennis*, Worth.

1888. *Cicada*, Woodworth, Psyche, V., 68.

Habitat—Arkansas, Arizona, New Mexico, Texas, Louisiana, Florida.

TETTIGIA, Kol.

1857. Kollenati, Mel. Ent. VII., 6.

1866. Stal, Hemip. Afr. IV., 23.

hieroglyphica, Say.

1830. *Cicada*, Say, Journ. Acad. Nat. Sci. Philad. VI., 235.

1859. *Cicada*, LeConte, Comp. Writ. Say, II., 371.

1888. *Tettigia*, Uhler, Ent. Amer. IV., 22.

characteria, Germ.

1830. *Cicada*, Germar, Thon. Entom. Archiv. II., 4.

1888. =*hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.

johannis, Walk.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 149.

1888. =*hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.

sexguttata, Walk.

1850. *Cicada*, Walker, Cat. Brit. Mus. Homop. I., 154.

1888. =*hieroglyphica* Say, Uhler, Ent. Amer. IV., 22.

Habitat—Pennsylvania, New Jersey to Florida, Alabama, Mississippi, Louisiana, Texas.

ZAMMARA, A. & S.

1843. Amyot et Serville, Hist. Nat. Hemip., 468.

smaragdina, Walk.

1850. *Zammara*, Walker, Cat. Brit. Mus. Homop. I., 33.
1881. *Zammara*, Distant, Biol. Cent. Amer. Homop. 3; pl. I., 1.
1888. *Zammara*, Woodworth, Psyche, V., 67.
1892. *Zammara*, Uhler, Trans. Md. Acad. Sci., 174.

angulosa, Walk.

1850. *Zammara*, Walker, Cat. Brit. Mus. Homop. I., 34.
1888. =*smaragdina* Walk., Woodworth, Psyche, V., 67.

Habitat—California, Mexico.

PRACTICAL ENTOMOLOGY.

A Contribution to the Study of the Insect Fauna of Human Excrement (with especial reference to the Spread of Typhoid Fever by Flies). By L. O. Howard, Ph.D. Proc. Washington Acad. Sciences, December 28, 1900. Royal 8vo., pp. 60, fig. 22, plates 2.

This paper, just issued by Dr. L. O. Howard, the United States Entomologist, is of enormous and far-reaching importance. The subject is, undoubtedly, at first sight an unpleasant one; but it is of such intense interest to all, that it becomes the duty of anyone who appreciates the bearing of this paper to draw public attention to it, as a source of authoritative and definite information on a subject which may affect the health of every individual in every community, especially where many human beings are gathered together, as in military camps and large cities. Moreover, this paper indicates a ready means, always available, by which the spread of typhoid fever, cholera and other kindred diseases may be to a large extent prevented. It has for some time been recognized by advanced physicians and some few others, that "flies" are the direct agents in the distribution of some diseases; but Dr. Howard, by the investigations which are here summarized, proves what kinds of flies are responsible for this evil, shows the way in which they do it, and points out how it may be prevented. The present contribution is a record of actual observations by Dr. Howard and his assistants at Washington, aided by correspondents in many parts of the United States. Dr. George M. Sternberg, Surgeon-General of the U. S. Army, and other high medical authorities are cited, showing the importance of the careful and regular treatment of fæcal matters in large encampments, and instances are given of the fatal results of neglecting the precautions recommended.

Dr. H. A. Veeder, in a paper entitled "Flies as Spreaders of Disease in Camps," published in the New York Medical Record of September 17, 1898, brought together a series of instances and strong arguments in favour of his conclusion that flies are prolific conveyers of typhoid under improper camp conditions.

In Dr. G. M. Sternberg's circular No. 1, published April 25, 1898, explicit directions were given to army surgeons regarding sinks, which, if explicitly followed, would have prevented the spread of typhoid by flies. Two sentences may be quoted from this circular: "Sinks should be dug before a camp is occupied, or as soon after as practicable. The surface of fæcal matter should be covered with fresh earth or quicklime or ashes three times a day. No doubt typhoid fever, camp diarrhœa, and probably yellow fever, are frequently communicated to soldiers in camp through the agency of flies, which swarm about fæcal matter and filth of all kinds deposited upon the ground or in shallow pits, and directly convey infectious material, attached to their feet or contained in their excreta, to the food which is exposed while being prepared at the common kitchen or while being served in the mess tent." Thus the Surgeon-General not only gave sound instructions, but stated his reasons for these instructions:

"In 1898 an epidemic occurred in the camp of the Eighth Cavalry at Puerto Principe, Cuba, in which 250 cases of the fever occurred. The disease was imported by the regiment into its Cuban camp, and Dr. Walter Reed, U. S. A., upon investigation, reported to the Surgeon-General that the epidemic 'was clearly not due to water infection, but was transferred from the infected stools of the patients to the food by means of flies, the conditions being especially favorable for this manner of dissemination.'

"The agency of flies in the transmission of Asiatic cholera was convincingly shown at an early date by the observations of Tizzoni and Cattani, Sawtchanko, Simmonds, Uffelmann, Flugge and Macrae, while Celli had shown as early as 1888 that flies fed on the pure cultures of *Bacillus typhi abdominalis* were able to transmit virulent bacilli into their excrement."

Owing to the prevalence of typhoid in the United States Army during the summer of 1898, an Army Typhoid Commission was appointed in that year, at the request of the Surgeon-General. The report of this Commission has not yet been published, but one of the members, Dr. Victor M. Vaughan, U. S. V., read before the annual meeting of the

American Medical Association, at Atlantic City, New Jersey, June 6, 1900, a paper entitled "Conclusions Reached After a Study of Typhoid Fever Among American Soldiers in 1898." This paper, which is one of the most important contributions to the study of enteric fevers published, comprises 53 categorical conclusions. The one relating to flies is as follows:

"27. Flies undoubtedly served as carriers of the infection.

"My reasons for believing that flies were active in the dissemination of typhoid may be stated as follows:

"*a*. Flies swarmed over infected fæcal matter in the pits and then visited and fed upon the food prepared for the soldiers at the mess tents. In some instances, where lime had recently been sprinkled over the contents of the pits, flies with their feet whitened with lime were seen walking over the food.

"*b*. Officers whose mess tents were protected by means of screens, suffered proportionately less from typhoid fever than did those whose tents were not so protected.

"*c*. Typhoid fever gradually disappeared in the fall of 1898, with the approach of cold weather and the consequent disabling of the fly.

"It is possible for the fly to carry the typhoid bacillus in two ways. In the first place, fæcal matter containing the typhoid germ may adhere to the fly and be mechanically transported. In the second place, it is possible that the typhoid bacillus may be carried in the digestive organs of the fly and may be deposited with its excrement."

The miasmatic theory of the origin of typhoid fever was not supported by the investigations of the Commission, and it was found that infected water was not an important factor in the spread of typhoid in the national encampments of 1898. The conclusion was reached that the fever is disseminated by the transference of the excretions of an infected individual to the alimentary canals of others, and that a man infected with typhoid fever may scatter the infection in every latrine, or regiment, before the disease is recognized in himself, while germs may be found in the excrement for a long time after the apparent complete recovery of the patient. The remarkable statement is made that in the encampments of 1898 about one-fifth of the soldiers developed typhoid, and that more than 80 per cent. of the total deaths were caused by this fever.

In all medical and newspaper literature on this subject the expression used in connection with insects has been simply "flies." It occurred to

Dr. Howard, in 1898, that from the scientific and practical points of view there was a distinct necessity for careful investigation of the insects which breed in human fæces, or are attracted to them; such an investigation was consequently begun in 1898 and carried on through 1899 and part of 1900. It is the results of this investigation which Dr. Howard now presents.

In summing up, Dr. Howard states that the number of insects found breeding in or frequenting human excrement was very large. There were many coprophagous beetles—44 species in all—and many hymenopterous parasites of beetles and flies, but these were not thought to have any importance from the disease-transfer standpoint. Of flies there were studied in all 77 species, of which 36 were found to breed in human fæces, while 41 were captured upon them.

The practical bearing of the work is brought out when we consider which of the forms are likely from their habits to actually carry disease germs from excrement, in which they have bred or which they have frequented, to food substances upon which human beings feed. Therefore, extensive collections of flies were made in pantries, kitchens, etc., by means of sticky fly-papers. No less than 23,087 flies were examined, of which 22,808 were the ordinary house fly, *Musca domestica*. A complete list is given of all species bred on or taken during the investigation, including a full account of the common house fly and its habits. There are excellent figures of many species, together with a great deal of information which will be of interest to scientific readers.

Dr. Howard points out that, although the most abundant species found breeding in or attracted to human excrement do not occur in kitchens and dining-rooms, yet the common house fly, notwithstanding the fact that it prefers horse manure as a breeding place, does, under some circumstances, as in army camps, where human excrement is left exposed, breed in that substance in large numbers, and, as it also is much attracted to food supplies, it may transfer to these the germs of typhoid or other epidemic diseases from the places where it has bred or to which it has been attracted. On account of these facts, it is recommended that box privies should be abolished from every community, that the depositing of excrement in the open within town limits should be considered a punishable misdemeanour, and every breach of this law should be brought to the notice of the police, so that the nuisance may be removed. Boards of Health in all communities are urged to look after the proper

treatment of horse manure, so as to reduce to a minimum the number of house flies. Practical inferences to be drawn from this important investigation are that house flies, which occur everywhere and have a remarkable capacity for flying or being carried long distances in railway trains or other conveyances, are capable of carrying the germs of fatal diseases from place to place, and are therefore a source of great danger. In view of this, steps should be taken to restrict as much as possible their opportunities for breeding, by rendering their favourite habitats unsuitable for the purpose. To this end all such exposed matter in which they could breed should be removed or covered up as quickly as possible. Ashes, lime, or even dried earth, are usually easily obtainable, and will answer well for this last-mentioned purpose. Steps should be taken to prevent as much as possible the entry of flies into hospitals, houses, kitchens and pantries, by means of screens on doors and windows, and all flies found inside such protected buildings should be destroyed by a constant use of fly-papers or pyrethrum insect powder. J. FLETCHER.

FOUR NEW SPECIES OF HIPPISCUS.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Since the publication, in Psyche for 1892, of my study of the Orthopteran genus Hippiscus, a few additional species have come to light, and they are herewith described. The first species belongs to the subgenus Hippiscus, the others to the subgenus Xanthippus.

Hippiscus citrinus, sp. nov.—A compact and stout though rather small form. Head rather stout and full, broad above, luteo-testaceous, more or less infuscated above, dark fuscous in a stripe behind the eyes, the carinæ more or less infuscated; summit of head obscurely punctate, the vertical scutellum obscure and, with the foveolæ, much as in *H. compactus*; frontal costa broad, flat, punctate, depressed at the ocellus, where it is slightly enlarged, but otherwise subequal; antennæ ferruginous in basal, blackish in apical half. Pronotum stout, somewhat constricted mesially and considerably expanded on the metazona, the disc nearly plane with rather heavy rugæ forming the scutellum of the prozona, the metazona nearly smooth, but with a few slight rugæ and granulations; median carina very uniform and not prominent, but on the metazona slightly arcuate as seen laterally; lateral canthi tolerably distinct on the metazona (but rounded posteriorly), considerably surpassing the median

sulcus; process of metazona feebly obtusangulate. Tegmina blackish fuscous with a heavy testaceous sutural stripe, and crossed at middle and beyond by a narrow pallid stripe, and at end of basal third by a cinereous patch, the apical fifth vitreous, crossed by a couple of blackish fuscous stripes; wings pale citron at base, hyaline apically, the sutural line luteous, with a broad, blackish fuliginous mesial band curving broadly around the outer margin to the anal angle, and in the humeral area sending a narrowing tænia half way to the base; it leaves the four upper lobes free at the margin, but the two upper are clouded apically; the last forked branch of the discoidal vein arises at the outer edge of the mesial band; hind legs much as in *H. compactus.*

Length of body, 25 mm.; tegmina, 25 mm.

1 ♂. Alabama; C. F. Baker; No. 1912.

The species is separated from *H. compactus* Scudd., to which it is most nearly allied, by the markings of the tegmina (in which the darker parts are much more extended) and in the surface structure of the pronotal disc.

Hippiscus glaucipes, sp. nov.— Dark fuscous, sometimes more or less ferruginous, of slender form and small size. Head not very large, dull fuscous above, elsewhere pale fusco-cinereous, occasionally pale ferruginous, dotted with obscure fuscous, the summit feebly granulate behind the fastigium, which is distinct, with sharply defined but not greatly elevated walls, almost as broad as long, divided in anterior half by a median carina, open posteriorly; lateral foveolæ distinct, subtriangular, longer than broad, the inferior margin arcuate, the superior straight, embracing with their tips a median foveola of similar size and depth, its margins arcuate above, straight beneath when clearly distinguished from the frontal costa, as especially in the male; frontal costa moderately broad, subequal but slightly contracted at the summit and below the ocellus, somewhat sulcate throughout. Pronotum compressed, a little expanded on the metazona, especially in the female, nearly plane above, but the metazona feebly convex in the female, the process rectangulate, the median carina slight, equal, straight, uninterrupted between the sulci, the lateral canthi distinct but confined to the metazona, the dorsal surface, especially of metazona, marked with short, slightly obliquely longitudinal, distinct rugæ, the prozona with a slight scutellum, the lateral lobes with a broad, distinctly retroarcuate curve posteriorly. Tegmina dark fuscous, darkest in basal third and at the middle, with a distinct and generally

broad testaceous sutural stripe, a testaceous or pallid patch beyond the middle, a cinereous patch midway between it and the base, and the outer third mostly pellucid with fuscous veins and more or less flecked with fuscous; wings pale citron on basal half, except where the humeral vitta runs in nearly to the base, blackish fuliginous beyond except for a pallid sutural stripe almost invariably present, the apex of the two uppermost lobes often more or less vitreous, generally not so dark as the rest of the outer half of the wing, the dark portion following the outer border to the anal angle. Hind femora cinereo-testaceous, the inferior carina and sulcus luteous, but otherwise often twice obliquely striped rather narrowly with fuscous; hind tibiæ glaucous or luteo-glaucous, the spines black-tipped.

Length of body, ♂ 19 mm., ♀ 28.5 mm.; tegmina, ♂ 20.5 mm., ♀ 25 mm.

5 ♂, 3 ♀. Yosemite Valley, Cal., Aug. 11; between Nevada Falls and Cloud's Rest, Yosemite Valley, Cal., Aug. 12; A. P. Morse.

This species is most nearly related to *H. obscurus* Scudd., differing from it chiefly by the structure of the surface of the pronotal disc, the less prominent median carina, the narrower tegmina, the presence of a sutural stripe on tegmina and wings, and the colour of the hind tibiæ.

Hippiscus validus, sp. nov.—Fusco-griseous, rather robust and somewhat below the medium size. Head rather large, more or less cinereous, rather broad and not very tumid above, the summit subrugulose, carinulate throughout; fastigium of vertex moderately deep, polygonal, with sharp but not very high walls, the frontal fastigium deeply impressed, constricted anteriorly, margined in front and behind as distinctly as at the sides; frontal costa moderately broad, strongly constricted above, slightly narrowed below the ocellus, somewhat sulcate or at least depressed at the ocellus; antennæ shorter than the head and pronotum, apically blunt and in no way attenuate in the female, castaneous, more or less infuscated apically. Pronotum expanding considerably on the metazona, which is nearly plane but rugulose, the anterior portion without signs of transverse plications, the process rectangulate with crenulate margin, the median carina slight, not altogether obliterated between the sulci, the lateral canthi sharp and distinct on the metazona, obscure or wanting on the prozona excepting on extreme front, the posterior margin of the lateral lobes vertical and not retroarcuate. Tegmina broad and rather short, but little surpassing the abdomen, griseo-cinereous, with

profuse irregular fuscous mottlings irregularly distributed, the anal line of the lighter colour, but sometimes obscure, the intercalary vein arcuate only at extreme apex, subequidistant throughout (and not very distant) from the median vein, the lower intercalary area broad and rather densely filled with anastomosing nervules, but not more densely than the area beneath it, the axillary vein united apically with the anal. Wings bright red (or occasionally citron?) at base, vitreous at apex, with heavily infuscated veins, and an extramesial, strongly arcuate, transverse fuscous band, about half as broad as the tegmina, tapering a little along the hinder margin, failing to reach the anal angle and leaving three marginal lobes free at the apex; it sends a stout humeral vitta to the very base. Hind femora cinereous, twice banded very obliquely and not very broadly with fuscous, very broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus red; hind tibiæ red, paling basally, or luteous.

Length of body, 36 mm.; antennæ, 9 mm.; tegmina, 29 mm.; hind femora, 16 mm.

4 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species is closely related to *H. calthulus* (Sauss.), but differs from it in the sharper median carina and lateral canthi of the pronotum, the disc of which is less coarsely rugose; the transverse fuscous band of the hind wings is also narrower.

Hippiscus croceus, sp. nov.—Fusco-griseous, rather robust, and considerably below the medium size. Head moderate, pale cinereous excepting above, the summit gently tumid, transversely rugulose, feebly carinulate throughout; fastigium of vertex not deeply impressed, but with distinct walls, hexagonal, open behind, as broad as long, the front portion separated off by a low transverse ridge to form a divided frontal fastigium; frontal costa moderately broad, subequal, scarcely contracted either above or below the ocellus, moderately sulcate at and below the ocellus, punctate above; antennæ a little shorter than head and pronotum, apically blunt and scarcely attenuate on last two joints in the female, testaceous, apically infuscated. Pronotum expanding moderately on the metazona, the disc of which is faintly tumid with not very frequent short longitudinal rugæ throughout, the process rectangulate with rounded angle and subcrenulate margin, the prozona posteriorly impressed, transversely plicate, the median carina slight, percurrent, the lateral canthi distinct but not sharp, the posterior margin of the lateral lobes

vertical above, but faintly retroarcuate below. Tegmina broad and rather short, though surpassing considerably the abdomen, cinereous, thrice rather narrowly banded with clustered fuscous maculations, the apical third mostly obscurely hyaline, the intercalary vein straight, subequidistant between the median and ulnar veins, the lower intercalary area not very broad, similar in density of anastomosing veins to the area beneath it, the axillary vein free. Wings citron at base, vitreous at apex, with fuscous veins, crossed at and beyond the middle by a dark fuscofuliginous band, as broad as the tegmina, including the hind margin and following it broadly to the anal angle; its outer margin on the spread wing is straight and a broad tænia in the humeral lobe runs almost to the base of the wing. Hind femora testaceous, thrice banded very obliquely and not very broadly with fuscous, broad, the inferior carina rather high and rather strongly arcuate, the inferior sulcus luteous; hind tibiæ luteous throughout.

Length of body, 25 mm.; antennæ, 9 mm.; tegmina, 27 mm.; hind femora, 14.5 mm.

2 ♀. Blaine Co., Idaho, July 23; Mus. Leland Stanford Univ.

This species belongs near the preceding species from the same district, and was collected on the same day. It differs in the sculpturing of the metazona and in the markings of the tegmina and wings. In the latter point it agrees fairly well with *H. montanus* (Thom.).

THE PROTECTIVE COLORATION AND ATTITUDE OF LIBYTHEA CELTIS, Esp., are described and figured in an article in a Russian magazine (Horæ Societatis Entomologicæ Rossicæ, Vol. XXXV., Nov., 1900), of which the writer gives the following English abstract: "The observations were made on the Southern coast of the Crimea. The butterfly in repose exactly resembles a dead leaf, just as many tropical Rhopalocera, with the famous *Killima* at their head. The circumstance that *Libythea celtis* makes use of its palpi and antennæ for the simulation of a stalk of a leaf is very singular, as no tropical 'leaf-shaped' butterfly does it. The coloration also completely conforms to the habits of the insect. The form of the folded wings, and the presence on the under side of the hind wings of a dark median vein, makes the resemblance to a leaf still more complete. We have thus in this species a unique example of a European butterfly which mimics the dead leaf as perfectly as several celebrated tropical species."—NICHOLAS KUSNEZOW, St. Petersburg.

[The photogravure plate shows three specimens of the butterfly in repose. The resemblance to a dead leaf is complete.]

ERRATUM.—On page 79, third line from bottom, read 1850, instead of 18—.

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The Canadian Entomologist

VOLUME XXXIII.

No. 4.

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REV. C. J. S. BETHUNE,

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NOTES ON WALKER'S TYPES OF SPILOSOMA CONGRUA, AND A FEW OTHER TYPES IN THE BRITISH MUSEUM.*

BY HENRY H. LYMAN, MONTREAL.

Having arranged for a two months trip to Europe during the past summer, I determined to visit the Natural History Branch of the British Museum, to endeavour to clear up the doubt surrounding Walker's *Spilosoma Congrua*, taking with me a number of specimens of *S. Antigone*, Strecker; a pair of the heavily-spotted Gomin form of *Spilosoma*, which Dr. Fyles calls *Cunea*, lent to me by Mr. Winn; a typical female specimen of *S. Prima*, kindly given to me by Mrs. Slosson; and a small series of *Hyphantria Cunea*, Drury. I reached London late on the 26th June, but on the morning of the 29th received a cablegram which necessitated my immediate return home. After making my arrangements to sail from Liverpool on the 30th, I found I had a few hours to spare, and so paid a very hurried visit to the Museum, and was shown what was supposed to be the three types of *Congrua* by Sir George Hampson, who kindly remained after the closing hour to accommodate me.

I had not sufficient time to make any attempt to verify these types by comparing them with Walker's original description, or that subsequently made by Grote & Robinson, or by looking up the register of acquisitions, and as Sir George Hampson seemed quite positive that there could be no mistake, I accepted his dictum. I would call attention to the note published by Mr. A. G. Butler in 1875, to the effect that the only specimens then representing *Congrua* in the British Museum collection were a presumably female specimen of *S. Virginica*, without abdomen, and what he believed to be a male variety of *Hyphantria Cunea*. The three specimens shown to me I found to be:

*Read at the annual meeting of the Entomological Society of Ontario, Nov., 1900.

(a) A male specimen of *S. Antigone*, Strecker, presumably of the type which Dr. Fyles described under the letter f.

(b) A female specimen of the heavily-spotted Gomin type of *Spilosoma*.

(c) The specimen of *S. Virginica* without abdomen, as described by Grote & Robinson.

On my return to Montreal, I looked up the description given by Grote & Robinson of the types *a-b*, to which they restricted the name *Congrua*, as quoted by me (CAN. ENT., XXXII., 123), and saw at once that there must be some mistake, as they described the type *b* as: "Primaries with but one or two dots, almost immaculate. Secondaries immaculate in either sex." I therefore wrote to Sir George Hampson, who admitted that the heavily-spotted specimen was probably not one of the types of *Congrua*, especially as he found that the locality label on the pin was New York, while the types were said to have come from Georgia. I only mention this to show how necessary it is to "prove all things," as we are exhorted to do by the apostle. Subsequently I was able to return to England for a brief visit, and shortly before my return home spent two or three hours at the Museum, and made an exhaustive examination of the specimens of *Spilosoma* and *Hyphantria*, and came to the conclusion that type *b* must have been destroyed, as I could find no specimen in the collection which would at all answer the description given by Grote & Robinson. The type specimen *a* is numbered 947, and is shown both by the date upon the label and by the Register to have been acquired on 19th June, 1839, at the sale of Mr. Milne's collection, at which a considerable number of specimens were obtained. It is entered in the Register merely as *Arctia*. It expands about $1\frac{9}{16}$ inches, and answers fairly well to the description given by Messrs. G. & R.

Type specimen *c* is a rather large specimen of *S. Virginica*, expanding about $1\frac{7}{8}$ inches, and is presumably a female, but the abdomen is missing. This specimen is very lightly marked, having only a black point on upper side of fore wing at lower angle of cell, and a black spot on the middle of the discocellular vein of hind wing below. The number on label is 937, and is entered as *Arctia* simply, and was received at the same time as the type *a*.

The question now arises as to the use or suppression of Walker's name, *Congrua*.

Sir George Hampson has informed me, both orally and by letter, that he regards the name *Congrua* as a synonym of *Virginica*, and intends to refer it in this way in his forthcoming work, and to retain Strecker's name, *Antigone*. In order to make this matter clear, it is necessary to have Walker's description before us, and I therefore reproduce it.

"White. Tarsi with black bands. Fore coxæ and fore femora luteous, with black spots on the inner side; fore tibiæ striped with black on the inner side. Male.—Head and fore part of the thorax with a slight testaceous tinge. Fore wings with four oblique, very imperfect and irregular bands, composed of pale brown dots. Length of the body 6–7 lines; of the wings 16–20 lines, *a–c* Georgia. From Mr. Milne's collection." Now, Sir George Hampson's contention is that the first part of the description down to the word "Male" applies only to the specimen of *Virginica*, and that therefore the latter, as there were at least two distinct species included under the name, should be regarded as the type of *Congrua*. With this contention, though sorry to differ from Sir George, I am unable to agree for the following reasons:

In the first place, I contend that an author's description must be taken as a whole, and not split up into parts, and that to give the first line of a description priority over the second is carrying the doctrine of priority much further than I, at least, am prepared to carry it.

In the second place, I contend that the first part of the description applies to both types. As both are white moths, neither is yellow, brown or any other colour, and probably to save himself a little trouble, or possibly merely to give variety to the form of his descriptions, Walker gave first the characters applying to both the supposed sexes, and then indicated the points in which one sex, in this case the male, went beyond the description so far given.

But there is a very important point in this connection which Sir George appears to have overlooked, and that is that type *b* has disappeared.

Now, as this was also a female, and, according to the description of Messrs. G. & R., must have been very close in appearance to the *Virginica* type *c*, though not that species, it seems highly probable that it answered as closely as the specimen of *Virginica* to the first section of the description, and, hence, even on Sir George's theory, would be equally entitled to rank as the primary type. Now, while it is impossible to be certain what type *b* was, still, from the fact that an entomologist of Mr. Grote's ability regarded it as of the same species as type *a* and different

from any species of *Spilosoma* known to him up to that time, it seems in the highest degree probable that it was a typical lightly-marked female of *Antigone*, in which case it seems to me that Sir George Hampson's contention would entirely fall to the ground. In the third place, Messrs. Grote & Robinson published their description of the species in 1868, retaining the name *Congrua* and referring type *c* correctly to *Virginica*, which should certainly be allowed weight, as all difficulty was thereby cleared up, the name *Congrua* being restricted to a single valid species. And, lastly, it is certain that the species described by Strecker in 1878, ten years after Grote & Robinson's description appeared, had been standing under the name *Congrua* in a great national museum since 1855, that is, for twenty-three years, before it was redescribed by Strecker.

Under these circumstances, I contend that the name *Congrua* should be used for this species, and the name *Antigone* be referred as a synonym. Before leaving this subject, I may mention that Sir George Hampson has informed me that as both this species and *Prima* have the claw on fore tibiæ, they belong to the genus *Estigmene*, Hübn., = *Leucarctia*, Pack., and not to *Spilosoma*.

In regard to the forms which Walker referred to *Cunea*, it is impossible to be certain, for while there are in the collection quite a number of specimens of this species, a good proportion of these have been received at later dates than those referred to by Walker. But of one thing we can be certain, and that is, that so far at least as the males go, he must have referred to *Punctatissima*, and it is a remarkable fact that in the collection there are no less than eight specimens of this species (7 ♂ and 1 ♀) having the hind wings more or less spotted, though in two males the spots are barely perceptible. But Walker's description of the female as "Hind wings with some brown submarginal spots," was probably based upon the one specimen of the heavily-spotted Gomin form of *Spilosoma*, or, I suppose, I should say *Estigmene*, which was entered in the Register, under number 950, as *Arctia Cunea*, and as received on 19th June, 1839, from Mr. Milne's collection. Another specimen, No. 951, was entered under the same name, but there is only the one specimen of the Gomin form in the collection.

Sir George Hampson called my attention to a specimen which he said agreed exactly with Walker's type of *Spilosoma Mutans*, which is in the museum at Oxford, and which specimen is only a very ordinary form of *Cunea* or *Punctatissima*. Sir George also showed me Walker's type of

Cycnia Dubia from Hudson's Bay, and there would seem to be no doubt at all that it is a drab-coloured variety of *Leucarctia Acræa* ♀, and there are also in the museum three other very similar females from the U. S., the only noticeable difference being that in Walker's type the wings are a little shorter in proportion to width, and that the veins are light-coloured. Sir George Hampson also called my attention to the fact that American entomologists have also been in error in referring *Platarctia Parthenos*, Harris, as a synonym of *Hyperborea*, Curtis, as these species are distinct, the latter appearing to be the American representative of *Hyphoraia Lapponica*, Thunb., and Harris's name should, therefore, be restored. I cannot understand how *Parthenos* was ever placed as a synonym of *Hyperborea*, as Curtis's description does not at all fit any specimen of *Parthenos* which I have ever examined.

Postscript.—As this paper contained criticisms upon unpublished and privately-expressed opinions of Sir George Hampson, I did not feel that I could publish it without referring it to him. Sir George replied that I had not stated his views quite correctly, and wrote: "I maintain that Walker originally wrote his description from the ♀ *Virginica* only, and that, afterwards finding two other specimens before publication, he added to his description; otherwise, he would have described the male first, as was his custom. The ♀ *Virginica* is the only one of the three to which the first part of the description applies, and is, therefore, Walker's type (*a*)—not (*c*) as you make it. The missing type (*b*) will not fit in with this first part of description, *vide* Grote's description of it, nor does the other specimen (*c*) now in the collection. Therefore, the ♀ *Virginica* is the type of the species."

To this I reply that the two remaining types reached the museum from the same source and on the same day, viz., 19th June, 1839, as shown by the Register, and were apparently so near together in the box in which received, that in numbering them one was numbered 937 and the other 947. The number of the missing type cannot be determined, but it was received on the same day. These specimens were, therefore, in the museum for sixteen years before being described, and, as they were of the same genus and from the same country, must have been kept together, and so have been before Walker when he was working on the group.

Walker does not use the word female at all, which shows that he considered the first part of the description applicable, so far as it went, to both sexes. Sir George says that it only fits the specimen of *Virginica*,

but it does not even fit it decently, as it makes no mention of the black spots on the wings of that specimen.

I did not, as suggested, transpose the designating letters of the types or choose them to fit in with any theory. I accepted them as used by Grote & Robinson (Vide CAN. ENT., XXXII., 123), and it must be remembered that these gentlemen made their examination of the specimens in Walker's presence, and presumably in consultation with him and with his sanction, and it is hardly conceivable that Walker would have called the two female types (*a*) and (*b*) and the male one (*c*). The missing type *b*, a ♀, as described by G. & R., must have come about as near to the description as the *Virginica* does.

Under these circumstances, I think it will be generally conceded that the name *Congrua* should stand.

Perhaps I have devoted too much space to this question, but I think that the correct application of one specific name is quite as important as that of any other.

NOTES ON THE OCCURRENCE OF LEPIDOPTERA, ETC., IN SOUTHERN MANITOBA.

BY E. FIRMSTONE HEATH, CARTWRIGHT, MAN.

A greater contrast between the last two seasons—those of 1899 and 1900—could hardly have obtained. The spring of 1899 was unusually wet, and the consequence was that the Manitoban prairie flea took refuge in our houses out of the rain, and life became almost unendurable between the armies of fleas inside and the clouds of mosquitoes without. So bad were the latter that, seasoned as I am to their attacks, all my night collecting was done under difficulties, for after covering myself as far as possible (rather a nuisance on a hot, close night), I had to bathe every square inch of skin that had of necessity to be exposed, with a strong solution of alum. This last year, through the unusually dry spring and early summer, to be bitten by a mosquito was quite an event. The fleas too took advantage of the fine, dry weather, and resumed their usual prairie life, and left us in our houses in peace. It may not be generally known, but some parts of the country swarm with fleas, while in others they are hardly to be found. In the olden days, before the railways, when we had to fetch our supplies from the nearest towns—Emerson, in my case—by waggon, camping on the prairie as we went along, I was several times cautioned by old settlers on no account to camp on certain

spots, or in certain localities, if it could be avoided, by reason of the swarms of fleas that had taken up their habitation there. These places were invariably those that would be selected as resting places, being dry, sandy or gravelly spots. Still, Manitoba cannot by a long way equal Southern Europe for fleas.

To my surprise, I did not take last spring (1900) a single Tæniocampa, or any of the other early species which are usually to be seen about the catkins of the white poplar *(Aspen tremuloides)*, in some numbers, in the evening; but the bloom of the wild plum was visited during the daytime by *Hemaris thysbe* and *tenuis* in more than average numbers, and at night, *Deilephila gallii*, *Mamestra Farnhami*, *Cucullia intermedia*, *Plusia simplex* were in quantity about the wild currant bloom; but hardly anything came to sugar on the trees, the evenings shortly after sunset becoming very chilly.

In 1899 the genus Acronycta came out in great force, and I secured at sugar several species new to my collection. This last season hardly an Acronycta was to be seen, its place being taken by the genus Agrotis (with the many sub-genera into which that old genus has been subdivided). Few as the Acronycta were, I secured a specimen of one new to me, *A. morula*, G. & R. Most of the most dangerous species, from an economic point of view, were strongly represented, and if a tithe of the produce survives the winter, cutworms of all descriptions will be rampant this spring.

Carneades tessellata, Harris, and *pleuritica*, Grt., which for a long time were only represented by one or two examples in my collection, were fairly numerous, and I secured a nice series of each. From among them I picked out one or two that looked decidedly different, and submitting one to Dr. J. B. Smith, he pronounced it to be his new species, *nordica*. *Leucania unipuncta*, Harv., has generally put in an appearance in small numbers about August, but this last season it appeared in June on my sugared trees, and continued in numbers until the autumn frosts set in. *Peridroma saucia*, Hbn., and *ypsilon*, Rott, and *Carneades messoria*, Harr., the larvæ of which are so destructive, were all more abundant than usual.

The Sphingidæ, on the whole, were sparingly represented, but *Cressonia juglandis*, of which I did not take in 1899 a single specimen, appeared again at light. Very few Hydrœcia were taken, but among the few were two or three *nelita*, Strecker. Owing to the dry weather in the

early summer, weeds were only an inch or two high, when in other years they would be as many feet, and I am afraid that the larvæ of some of the species of this genus must have been put to some inconvenience by lack of food. I have never seen so few Catocala come to sugar as last season, and of *grynæa*, of which, in 1899, I might have taken dozens of specimens, I did not see one. *Plusias* made a very poor show, and the autumn species, *Xylina* and *Calocampa*, were hardly represented.

Although, in point of numbers, both of species and genera, last year is not to be compared with the previous one, still I was so fortunate as to add a few new things to my collection, including a specimen of *Euthyatira pudens*, Grt.; *Platysenta atriciliata*, Grt.; *Cleoceris curvifascia*, Smith; *Tæniocampa peredia*, Grt., etc., and several Geometers which await identification.

The dry weather quickly began to tell upon the butterflies, though the earlier ones appeared in their usual numbers. I certainly noticed a good many *whites*, but thinking they were all *rapæ*, I did not net any, and I have no small-boy's catch to fall back upon like my friend, Mr. Hanham, so I cannot say whether or not *napi* was among them. The *blues* were not in anything like their usual numbers. I did not see a single *Thecla titus*, generally plentiful; only one *Thecla strigosa*, and one *T. calanus*. *Chionobas varuna*, on the other hand, was more plentiful than usual. I took *three*, and saw several more, *one* being usually the extent of my catch annually. *Pyrgus tessellata* was not seen, and the late-flying Pamphilas were hardly noticed.

Cutworms did great damage to garden stuff generally, but the Colorado beetle, which did a good deal of damage in 1899, was not to be seen; the potatoes not being up before July, owing to the drought, escaped its attacks. No injury to grain from Hessian fly, or wheat midge, came under my notice. In the damp spring and summer of 1899 I had a good deal of damage done by the larva of *Dermestes talpinus*, Mann. (?), attacking moths while on the setting-boards. I need not say that if there happened to be on a board a moth much rarer than the others, that was the one selected for its attacks. Last year I only caught one, though they had, if in existence, the same chance of being troublesome, and that fellow was feeding on the body of a moth that was new to me, although there were others quite as toothsome-looking specimens on the boards.

A NEW PLANT-LOUSE INJURING STRAWBERRY PLANTS IN ARIZONA.

BY T. D. A. COCKERELL, EAST LAS VEGAS. N. M.

Myzus fragæfolii, n. sp.

"Apterous female and larvæ white or faintly yellowish. Eyes dark brown. Antennæ concolorous with body or faintly brownish; apex of the fifth, the sixth and its spur pale dusky. Tarsi dusky, their apex black.

"Winged female: slightly more yellow, the head, thoracic lobes and sternal plate blackish brown. Antennæ black; the two basal joints of colour of body, or with a faintly dusky tinge. Legs pale dusky; the terminal third or half of the femora pale dusky; apex of tibiæ and the tarsi black. The abdomen is marked with a small, squarish, dusky spot in front of nectaries. Stigma pale dusky, veins black." (Theo. Pergande MS.).

Apterous ♀ 1200 μ long; cornicles 400 μ. Rostrum reaching to insertion of hind legs. Back with capitate hairs (about 65 μ long) *on all the segments*; there are also two capitate hairs on the front, between the frontal tubercles; two at apex of each frontal tubercle; three on gibbosity of first antennal joint, one of them short; one on second antennal joint; one short one about 39 μ from base of third antennal joint. Antennæ 6-jointed, joints measuring as follows in μ: (1.) 90, (2.) 50, (3.) 300, (4.) 200, (5.) 220, (6.) 505, with the basal part, to the notch, 90. Hind legs: femur, 360; tibia, 630; tarsus (excl. claw), 84 μ.

Winged ♀ 1200 μ long; hind tibia 800 μ; antennæ about 1500 μ; eyes prominent, large. Frontal tubercles slightly gibbous anteriorly, the gibbosity about 15 μ high; first antennal joint gibbous in front, the gibbosity rounded and very blunt.

Hab.—Jerome, Arizona, on leaves of strawberry, very abundant, not producing any deformation. Collected Dec. 10, 1900, by Mr. E. L. Jordan, who reported the insect as very destructive the year previous; "they get in the buds and blossoms and destroy the young fruit, and the berry is imperfect when ripe."

M. fragæfolii is noticeable for the abundant development of the capitate hairs in the apterous form, whereby it is allied to *M. ribis* and *M. elæagni*. I am greatly indebted to Mr. Theo. Pergande for the information that it is surely undescribed, and for a description of its colours in life, which I have quoted above. While I have prepared this article in deference to Mr. Pergande's wish, it will be apparent to the reader that the credit for the discrimination of the species is really his.

ON SOME ARIZONA ACRIDIIDÆ.

BY A. N. CAUDELL, WASHINGTON, D. C.

The following species of Acridiidæ were recently purchased by the writer from the collector, Dr. R. E. Kunze, of Phœnix, Arizona. There are thirty-two specimens, representing eleven species, one of which is apparently undescribed, representing a new genus. Several of the species are, for various reasons, quite interesting, and all are herein listed. They are as follows:

1.—HIPPISCUS LEPROSUS, *Sauss.*

Xanthippus leprosus, Sauss. Prodr. Oedip., 92 (1884).

Hippiscus leprosus, Scudd. Psyche, VI., 334 (1892).

One female; Pinal Mts., Gila Co.; July 24, 1900.

This species was determined by Mr. J. A. G. Rehn, of Philadelphia.

2.—TRIMEROTROPIS VINCULATA, *Scudd.*

Trimerotropis vinculata, Scudd. Proc. Bost. Soc. Nat. Hist., XVIII., 270 (1876).

Trimerotropis cincta, Sauss. Prodr. Oedip, 171 (1884).

One male, two females; Pinal Mts., Gila Co.; July 12–18, 1900.

One of the females has the posterior tibiæ very slightly tinged with red.

ARÆOPTERYX, nov. gen.

Head moderately prominent, nearly as wide as the metanotum and distinctly elevated above the pronotum. Antennæ filiform. Eyes subglobular, prominent, quite remote from each other, the space between them three times as broad as the extreme width of the basal segment of the antennæ. Fastigium feebly sulcate, with well-elevated margins, which terminate between the eyes. A moderately distinct median carina extends from the middle of the fastigium to the anterior margin, where it meets with the lateral carinæ, which converge at that point. Lateral foveolæ large, shallow and subtriangular in shape. The frontal costa averages about one-third the width of the interocular space, is sulcate throughout, has moderately-elevated margins and gradually narrows in the upper half to just before reaching the vertex, where it suddenly broadens and then immediately narrows again as it meets the fastigium. Lateral carinæ of the face about as prominent as the sides of the frontal costa and subparallel with them. Thorax transversely wrinkled on the slightly tectate pronotum and longitudinally rugose on the flattened disc of the metanotum. The principal sulcus cuts the thorax before the middle,

making the metanotum nearly a third longer than the pronotum. Median carina distinct but faint on the metanotum, on the pronotum visible only as longitudinal rugosites. Lateral carinæ present only on the metanotum, and there very blunt, scarcely more than rounded shoulders. Thorax obtusely angled behind, in front truncate, but considerably produced in the middle. Lateral lobes subperpendicular, subangulate at the posterior angle. Interspace between both meso- and metathoracic lobes very strongly transverse. Tegmina and wings very long and slender, especially the former, which is nine times as long as the middle breadth. Humeral shoulder slight. Intercalary vein moderately strong, transversing nearly the middle of its area. Posterior femora moderately slender, the dorsal carina considerably elevated.

This genus has a general resemblance to Trimerotropis, Conozoa, Psinidia and Anconia, but differs in some particulars from all of them. It is probably the most nearly allied to Anconia, by reason of the slight development of the median carina on the pronotum, but is readily separated from that monotypical genus by the form of the frontal costa, the rugose metanotum and the more elongate elytra.

3.—ARAEOPTERYX PENELOPE, nov. sp.

One female; Prescott; September 29, 1900.

Head of a uniform reddish brown colour with a number of somewhat minute fuscous spots on the facial carinæ and the margins of the fastigium and frontal costa. Eyes quite prominent, almost globular, not so long as the infraocular portion of the genæ and concolorous with the head. Antennæ black, except the first and second segments, which are light. Thorax reddish brown, with the prosternum pallid. The sides with an oblong black mark extending diagonally across the middle, directed upwards and backwards and terminating before it reaches the posterior border of the metathoracic lobe. This is very probably a variable character, as it differs slightly on the two sides of the present specimen. Elytra more than twice as long as the posterior femora, very slender, gently inclined backwards distally and membranous over most of the apical half. Ground colour a shade lighter than that of the thorax and somewhat irregularly maculate throughout with fuscous, the infuscation being most conspicuous on the humeral angle and an oblong space at the end of the basal half of the costal margin, where it is quite dense. Wings considerably more than twice as long as the greatest width, base reddish pink in colour, beyond hyaline with infuscation along some of the veins

and very slightly infumate on the lower half next the coloured base. There is a long black stigma and an ill-defined tænia extending nearly to the base. Abdomen a little lighter in colour than the rest of the body. Anterior and middle tibiæ twice banded with fuscous and with the extreme tip black, armed below towards the apex with a few sharp black spines. Fore and middle tarsi variegated above, the basal segment pallid with the proximal end black, the second segment wholly black and the terminal segment entirely pallid with the claws tipped with black. Posterior femora slightly hoary on the outer face, very inconspicuously banded on the apical third with fuscous. Inner face black with light crossbars on the apical half, where the fuscous becomes eliminated. Genicular arcs slightly marked with fuscous. Posterior tibiæ and tarsi yellowish, the former preapically infuscated below and armed above with moderately stout spines, eight or nine in the outer series. Calcaria and spines black on the terminal half.

Length of body, 25 mm.; tegmina, 27 mm.; wing, 24 mm.; posterior femora, 12.5 mm. Width of elytra at middle point, 3 mm.; of wing at broadest part, 11.5 mm.

Type No. 5717, U. S. N. M.

Dedicated to my wife, in recognition of her interest and aid in my work.

4.—ANCONIA INTEGRA, *Scudd.*

Anconia integra, Scudd. Ann. Rept. Chief Eng., 1876, 515 (1876).

Two males, five females; Phœnix; April 12—September 29, 1900.

This variable species was described from a single pair collected by Dr. O. Loew in the Mojave Desert, Lower California. Since then it has been reported from Death Valley, California.

The colour of this species varies from an almost uniform greenish yellow to very conspicuously spotted with fuscous on the head, thorax and elytra. The posterior femora are usually distinctly bifasciate above with black. The thorax is sometimes very conspicuously varied above by four cream-coloured marks: two, almost approximate, on the anterior part of the pronotum, and two, divergent and widely separated, on the lateral borders of the metanotum. These markings fade somewhat in drying. The lateral lobes of such marked specimens are pallid along the lower borders and furnished near the middle, in front, with an oblong, similarly coloured mark.

5.—SCHISTOCERCA SHOSHONE, *Thom.*

Acridium shoshone, Thom. Proc. Acad. Nat. Sc. Philad., 1873, 295 (1873).
Schistocerca shoshonè, Scudd. Proc. Amer. Acad. Arts Sc., XXXIV., 469 (1899).

Two males; Phœnix, October 8, 1900, and Pinal Mts., Gila Co., July 24, 1900.

6.—SCHISTOCERCA VAGA, *Scudd.*

Acridium vagum, Scudd. Proc. Bost. Soc. Nat. Hist., XVIII., 269 (1876).

One female; Prescott; without date.

7.—HESPEROTETTIX FESTIVUS, *Scudd.*

Hesperotettix festivus, Scudd. Rev. Mel., 60, pl. IV., f. 10 (1897).

Three males, six females; Phœnix; September 29—October 22, 1900.

This species has hitherto been reported only from California and Utah. The specimens from Arizona have distinct red pregenicular annulations on the posterior femora, and there are no blackish genicular crescents, as mentioned in Scudder's description. Mr. Rehn thought they might be an undescribed species, but they too nearly agree with the types of *H. festivus* in the collection of the National Museum to be considered different.

8.—MELANOPLUS DEVASTATOR?, *Scudd.*

Melanoplus devastator, Scudd. (pars.) Proc. Bost. Soc. Nat. Hist., XIX., 285–8 (1878).
Melanoplus devastator, Scudd. Rev. Mel., 196, pl. XIII., figs. 3–7 (1897).

One female; Phœnix; October, 4 1900.

A single female specimen is referred with some doubt to the above species. It seems to belong near the variety *typicalis*.

9.—MELANOPLUS HERBACEUS, *Brun.*

Melanoplus herbaceus, Brun. Bull. Div. Ent. U. S. Dep. Agric., No. 28, 25–6, f. 13 (1893).
Melanoplus herbaceus, Scudd. Rev. Mel., 153, pl. X., f. 10 (1897).

One female; Phœnix; October 9, 1900.

10.—MELANOPLUS RILEYANUS, *Scudd.*

Melanoplus Rileyanus, Scudd. Proc. Amer. Phil. Soc., XXXVI., 7, 32 (1897).
Melanoplus Rileyanus, Scudd. Rev. Mel., 151, pl. X., f. 9 (1897).

One female; Phœnix; September 30, 1900.

11.—MELANOPLUS YARROWI, *Thom.*

Caloptenus yarrowi, Thom. Rep. Geol. Geog. Expl. 100th Mer., V., 894, pl. XLV., f. 5 (1875).

Melanoplus yarrowi, Scudd. Rev. Mel., 369, pl. XXV., f. 2 (1897).

Two males, three females; Phœnix; October 2–10, 1900.

One of the females is very large, the measurements being as follows: Length of body, 35 mm.; tegmina, 26 mm.; posterior femora, 19 mm.

This species was described by Thomas from a single female collected in one of our Western States. The type was afterwards lost, but Scudder has re-identified the species from one male and one female from Grand Junction, Mesa County, Colorado. Thomas's specimen was probably from Arizona, though no definite locality was given at the time.

LECANIUM WEBSTERI, CKLL. AND KING, N. SP., WITH NOTES ON ALLIED FORMS.

BY GEO. B. KING, LAWRENCE, MASS.

IN CANADIAN ENTOMOLOGIST, 1895, p. 255, Prof. Cockerell gave some notes and briefly described a species of *Lecanium*, found by Prof. Webster and others, as *L. ribis*, Fitch. Later, in April, 1899, in "The Industrialist," p. 234–5, he again describes it and gives measurements of the antennæ and legs, and states that Mr. Pergande has some doubt about the identification. In November, 1900, Prof. Cockerell sent me two lots of *Lecanium*, collected by Prof. W. D. Hunter at Ames, Iowa. These I determined as *L. ribis* (based on Prof. Cockerell's notes), and sent a statement of my determination to him. Very soon I received a reply, in which he cited Fitch's description of *L. ribis*, and stated that under the circumstances the species which he called *L. ribis* apparently must be something else, and suggested for it the name *Lecanium Websteri*, based on the species from Ohio, described in "The Industrialist," April, 1899, p. 235. On receipt of this letter, I wrote to Dr. Howard, requesting him, if possible, to let me have some of Fitch's *L. ribis*. His reply was as follows: "Mr. Pergande says that he is unable to decide which of our Eastern species is identical

with *L. ribis*, Fitch. Fitch's type has been destroyed, and there is nothing left but a fragment of the twig on which the species was found, showing only the original size, which must have been between 5 and 6 mm. in diameter. Since Fitch's short description appears to agree with *L. armeniacum*, Mr. Pergande thinks it to be that species, or a pale form of *L. cerasifex*, which is our most common Eastern species." At the same time, Dr. Howard kindly sent me some of Prof. Cockerell's *L. ribis*. These, together with specimens from Dr. Fletcher, P. J. Parrott, and those found by me in Massachusetts, were critically studied.

During the examination of these several lots of scales, it was questioned whether some, or perhaps all, might be very near if not identical with *L. Kansasense*, Hunter. I therefore wrote to Prof. Hunter for some of his species. Without delay, he kindly forwarded one of his type slide mounts, together with some scales *in situ*. These proved to be different from the species described by Prof. Cockerell as *L. ribis*, although in the antennæ and legs there seems to be no specific difference, but in the scale they differ very materially, being larger, very shiny, dark chestnut brown, distinctly pitted, and the texture of the scale much thicker. *L. Canadense*, Ckll., differs in the scale being much larger than *Websteri* or *Kansasense*, smoother, not so shiny, more convex, and not distinctly pitted. The antennæ and legs are larger and stouter, although the formula of the antennæ is nearly the same. *L. armeniacum*, Craw., is another perplexing species, which has practically seven-jointed antennæ, although, however, we find some individuals with only six joints, with the third very long and much resembling those already cited above. The scale of this species is quite large, of a pale brown colour, texture very thin, crowded closely together on the twigs, minutely pitted and not shiny. *Lecanium Websteri*, therefore, will be known by its very small size: 3 mm. long, 2 broad and about 2 high, of a yellowish brown colour; texture thin, not at all shiny, apparently inclined to be much shrivelled, nearly hemispherical in shape and not distinctly pitted, as in *L. Kansasense*, which is its most nearly related species. *L. Websteri* is normally a six-jointed species. In no instance did I find an individual with both of its antennæ to have seven joints. One would be six and the other seven, while it was not an uncommon occurrence to find individuals distinctly six-jointed. This will also apply to *L. Kansasense* and *L. Canadense*. The following measurements in micromillimeters will, it is hoped, assist in the recognition of the various species cited in this paper:

Antennal Segments of Lecanium Websteri.

	1	2	3	4	5	6	7	
Prof. Cockerell's original description of specimen from Ohio.	42	32	99	18	15	33		Formula 316245.
Those received from Dr. L. O. Howard.	36	36	80	16	20	32		Formula 3(612)54.
On mulberry at Kansas. (P. J. Parrott.)	40	40	100	20	20	40		Formula 3(612)45.
On *Celtis occidentalis*, Ames, Iowa.	20	32	92	20	20	52		Formula 362(145).
(W. D. Hunter.)	20	28	92	20	20	40		" "
On *Acer saccharinum nigrum*, Ames, Iowa.	36	36	40	24	16	16	36	Formula 3(712)4(56).
	32	32	76	12	20	40		" 36(12)54.
(W. D. Hunter.)	32	32	76	16	24	40		" "
On Ribes, at Nova Scotia.	28	40	88	20	24	44		Formula 362154.
(Dr. J. Fletcher.)	20	40	44	44	16	20	44	" (347)2(61)5.
On high-bush blueberry, Lawrence, Mass. (G. B. King.)	40	36	100	24	24	44		Formula 3612(45).
On white birch, Methuen, Mass.	40	40	108	24	24	60		Formula 36(12)(45).
(G. B. King.)	48	44	64	52	80			An abnormal 5-jointed form.
On *Spiræa*, Lawrence, Mass. (G. B. King.)	40	40	100	20	20	48		Formula 36(12)(45). This had also a 7-jointed individual, 3 divided in the centre.

On *Cercis Canadensis*, Kansas. (Prof. Hunter type sp.)	32	28	76	20	16	36		Formula 361245.
On shad-bush, Methuen, Mass. (G. B. King.)	24 28 20	40 40 28	72 76 92	16 20 20	12 16 30	44 40		Formula 362145. " " An abnormal 5-jointed antennæ, and these have a 7-jointed antennæ.

LECANIUM CANADENSE.

On Ulmus Americana, Kansas. (S. J. Hunter.)	44	40	96	24	28	48		Formula 36(12)54.
On oak, Andover, Mass. (G. B. King.)	48	56	100	20	20	48		Formula 32(61)(54).
Prof. Cockerell's measurements of the 7-jointed form from Maine.	42	32 39	62–98	54	20 22	20 22	40 47	The formula of the 6-jointed form from Maine and Canada: 326154 3(126)54–362145.

LEG OF L. WEBSTERI.

	Coxa.	Femur and trochanter	Tibia.	Tarsus.	
Prof. Cockerell's spec. from Ohio.	99–115	145 149	99	54	
Those from Dr. Howard.	92 72	160 44	112 24	64 20	broad.
On *Celtis occidentalis.* (W. D. Hunter.)	80	128	84	60	
On *Acer saccharinum nigrum.* (W. D. Hunter.)	80	120	72	60	
On high-bush blueberry, Lawrence, Mass. (G. B. King.)	80 60	160 48	108 24	70 20	broad.

COLLECTING NOTES ON KANSAS COLEOPTERA.—II.

BY W. KNAUS, MCPHERSON, KANSAS.

The past two seasons in Kansas have proved fairly profitable to the collector of Coleoptera. To the plains collector the "open" season for successful collecting extends from April 1st to October 15th. If he is so fortunate as to reside beside or near a wooded stream, his "open" season covers the cycle of the months, as winter sifting proves almost as profitable as collecting during the summer months, especially if he looks after the small things, and he is not possessed of the genuine collector's spirit if he does not look carefully after the minute things in insect life.

My collecting for the past two seasons has been done principally at McPherson, near Medora, Reno County; at Rago, Kingman County; Belvidere, Kiowa County, and at Wallace, in Wallace County; and at each locality something new develops each season. Wallace is always an interesting collecting region, and the collector can count on finding some "good things." Here along the clay bluffs south of the Smoky Hill River, is found during June and July *Amblychila cylindriformis*, Say, the elephant, in size, of the tiger beetle family. Hidden in holes and burrows during the day, they emerge at nightfall and seek for food, dining off the various insects of the region, and themselves proving a dainty morsel for the predatory skunk. I collected at Wallace on July 11th and 12th of this season in company with Nathan Reist, of Lime Rock, Pa., and in two evening's work we were so fortunate as to take eleven specimens of *Amblychila*.* They do not move at all rapidly, but if one emerges from a hole and sees you, it does not take him long to seek protection under ground. In collecting in the semi-darkness you are liable to be deceived by the Buffalo cricket and the slow-moving *Tenebrionid*, *Eleodes longicollis*, both of which forage at night. I have never taken *Amblychila* except at Wallace, but my friend, Claude J. Shirk, found a specimen near the Canadian River, in Hansford County, Texas, the latter part of July.

Another desirable *Cicindelid* found at Wallace was *Cicindela pulchra*, Say. Some fifty specimens were taken during two days collecting. They were found along and near abandoned or little-travelled roads on the upland and towards the top of the clay bluffs along the

*Prof. S. W. Williston, of the State University at Lawrence, Kansas, who was one of the original discoverers of this species at Wallace, tells me that in 1877, while collecting along these bluffs with his brother, he took as many as a hundred specimens in one night. In recent years, however, they have never been taken in any numbers.

edge of the Smoky Valley. Another species taken was *Cicindela micans*, Fab., the green or more rarely blue variety of *punctulata*. They mingle with the *punctulata* in the proportion of about one of *micans* to ten of *punctulata*.

Three species of *Calosoma* were taken: *obsoletum*, Say, on the upland; *triste*, Lec., on the bottom land, and *lugubre*, Lec., in both localities. All are crepuscular and hide during the day. *Obsoletum* were found under boards, cow chips and weeds during the day, but on the evening of the second day the sky became overcast about five o'clock and *obsoletum* suddenly appeared by the hundreds. One could walk along the main travelled road and pick them up every few feet.

Collecting in the Smoky Hill, here a shallow, narrow, rapid-running stream, fed by springs, two specimens of the comparatively rare *Hydrophilus ellipticus*, Lec., were taken. Just above the valley, south of the Smoky at Wallace, the Yucca is abundant. In July the upright stems bear large seed-pods, and among these seed-pods were taken on July 12th over sixty specimens of the beautiful *Clerus Spinolæ*, Lec. Their scarlet bodies were easily discernible, but as they were quick movers in the hot sunshine, it took dexterous work to capture them. Feeding on these Yucca pods were numbers of the large black blister beetles, *Epicauta corvina*, Lec., with an occasional *Macrobasis immaculata*, Say.

Quite rare and usually difficult to take, careful work will disclose each season a few of the handsome *Clerus cordifer*, Lec. They are found on thistles, the sage brush and a few other plants. Beating sage brush and flowering plants enabled us to take a number of *Trirhabda attenuata*, Say. While beating willows for *Poecilonota thureura*, Say, numbers of which can be taken each season, I took in July, 1899, a single specimen of a large Mordellid, *Tomoxia bidentata*, Say. The same species has been taken at Onaga, Kansas, by F. F. Crevecœur. Seven specimens of *Cantharis biguttata*, Lec., were found on flowering plants along the road over the clay bluffs south of the Smoky Hill. The specimens vary much in size and marking, the spot on each elytron frequently being obsolete.

But one species of *Apion* was found at Wallace last season, *Apion varicorne*, Smith. It is a common south-west plains species, being taken at Coolidge, Kansas, and I have received specimens from New Mexico. The large *Curculionid*, *Ophryrastes tuberosus*, Lec., is taken occasionally, and *O. vittatus*, Say, more commonly. *Endalus setosus*, Lec., occurs

rarely, and a single specimen of *Anthonomus hirtus*, Lec., was taken last season. *Anthonomus squamosus*, Lec., was taken in numbers in July.

Collecting at McPherson and vicinity last season developed a number of interesting forms. The first *Cicindelid* observed was a *purpurea*, Oliv., on February 5th. Several specimens of this, together with a few *graminea*, Sch., and numbers of *splendida*, Hentz., were taken in an abandoned sand pit two miles south-east of McPherson during March and the first half of April. The same species, but in less numbers, were found in this locality in September and October. A pair of *scutellaris*, Say, were also taken there the latter part of April. *Splendida* was taken in all its varied forms. Near this same locality early in June numbers of the very small *Apion tenuirostrum*, Sm., were taken feeding on flower catkins; and on the leaves of the water dock growing in the pools of a small creek were found a number of *Anchodemus angustus*, Lec. The electric lights of McPherson attract much desirable material. One specimen of *Apenes lucidula*, Dej., was taken in August. During July and August a few examples of *Helluomorpha bicolor*, Harr., were taken, and in June and July numbers of *Laccophilus 4-lineatus*, Horn, were secured, and a less number of *Eretes sticticus*, Linn. A half dozen specimens of *Dineutes vittatus*, Germ., were taken from the light globes. The specimens were at least a third larger than Pennsylvania specimens of this species. *Pelonomus obscurus*, Lec., were attracted in large numbers by the lights during June and July. One or two specimens each of the *Elaterids*, *Anelastes Druryi*, Kirby, and *Latreillei*, Lec., were taken from the lights late in the season. A rather curious looking *Lampyrid*, *Phengodes plumosa*, Oliv., also occurred in the electric lights the last season. Of the rare *Lachnosternids*, *inversa*, Horn, and *Ulkei*, Smith, were taken in June, probably a dozen specimens in the two species. Late in July two specimens of *Polymoechus brevipes*, Lec., were found in the light globes, the only time I have ever taken this Scarabæid in this State. A specimen each of *Tenebrionid*, *Alphitobius piceus*, Oliv., and *Platydema micans*, Horn, were also taken from the lights. Neither had ever been recorded from the State before. Two specimens of the comparatively rare *Myodites scaber*, Lec., were taken three miles north of the city in June feeding on flowers. Their striking resemblance to a Dipteron would cause them to be overlooked. *Macrops humilis*, Gyll., is not at all a common Curculionid attracted to light, as only a single specimen was found. A few *Endalus setosus*, Lec., turned up this season

in the lights. One specimen of *Balaninus uniformis*, Lec, was also taken at McPherson. A single specimen of *Anthribulus rotundatus*, Lec., was taken early in the spring under a piece of board, the first record of this species in Kansas. *Lachnosterna bipartita*, Horn, occurred in large numbers the latter part of last April, together with a less number of *marginalis*, Lec. Among almost a hundred specimens of *bipartita*, less than a half dozen females were found.

A brief collecting trip October 15th, to the north-western part of McPherson County, resulted in finding some desirable species. Three miles south-west of Marquette, where a stream issuing from the sandstone bluffs feeds a small rivulet, the lichens and ferns growing over the damp sand yielded a half dozen specimens of *Bembidium lugubre*, Lec., and four specimens of a rather rare *Staphylinid*, *Geodromicus brunneus*, Say. Under stones along the margin of the brook were found numerous specimens of *Phœnonotum extriatum*, Say, a *Hydrophilid* not heretofore recorded from Kansas. In the pools were found *Agabus semivittatus*, Lec.

The range of sand hills near Medora, Reno County, sustains a large and varied insect family, and each year furnishes surprises to the collector. While walking along the railway from the station to the point where the road cuts through the sand hills, on May 29th, in company with Mr. Reist, two specimens of *Helluomorpha Clairvillei*, Dej., were taken under railway ties. This species is south-eastern, and has never been previously recorded from this State. Near a pile of new railway ties a single specimen of *Trichodes Nuttalli*, Kirby, was found. This species had probably been introduced in the larval state in the ties. *Brachyacantha albifrons*, Say, was taken this year by beating willows; a few specimens only. In the Yucca flowers were taken a single specimen of *Carpophilus melanopterus*, Er., and a few specimens of its variety, *rufus*. This species was also found feeding on Yucca flowers at Rago, in May. Feeding on a species of dock near the sand hills, quite a number of *Lema cornuta*, Fab., were captured. *Lema collaris* was even more numerous. Both are shy and are not easy of capture. A *Lachnosternid*, near *affinis*, Lec., was taken during the early evening at Medora. Feeding on willows were numerous specimens of *Metachroma angustula*, Cr., and *Metachroma parallelum*, Horn. Both are comparatively rare in collections. *Ammodonus fossor*, Lec., has always been a rare *Tenebrionid*, but will not be so in the future. It was the most numerous *Tenebrionid* of the season. It occurs on the bare sand, and is protected by its colour being of the same shade as the

surrounding sand. They were found in almost every depression, and careful looking would show an occasional specimen walking over the surface of the sand with a quick jerking motion. Other cases of almost perfect colour mimicry are furnished by the small *Anthicids*, *Mecynotarsus candidus*, Lec., and *Anthicus pallens*, Lec. They are remarkably quick runners, and almost the exact colour of the sand. The first species was rather common; the other, only two specimens found. Both are Atlantic species, and are taken on the sand dunes of the New Jersey coast. *Oberea pergrata*, Say, is found on the willows, and *Apion segnipes*, Say; *griseum*, Smith, and *occidentale*, Fall., are taken on sunflowers. This season I found three specimens of *Stephanucha pilipennis*, Kraatz, and a dozen specimens of *Cremastochilus nitens*, Lec. *Cotalpa lanigera*, Linn., was common feeding on willow catkins.

A single half day's collecting along the Republican River, near Superior, Nebraska, May 25th, was rewarded by a capture of a number of interesting species. *Bledius ineptus*, Casey, or a species closely allied, is found burrowing in the sandy mud bars close to the river. *Scymnus Phelpsii*, Cr., is a small *Coccinelid*, with elytra almost entirely pale, a single specimen of which was taken by beating. *Mantura floridana*, Cr., was beaten from the willows in small numbers. A single specimen of *Macrorhoptus hispidus*, Deitz, was beaten from willows, as well as a number of *Anthonomus Bolteri*, Deitz.

At Rago, in Kingman County, *Horistonotus Uhlerii*, Horn, was beaten from willows on June 24th. An undescribed species of *Diplotaxis* was also found here. *Strigoderma pygmæa*, Fab., was also found here, the first record of its capture in Kansas. It is an Atlantic coast species from Florida to New Jersey. *Oberea oculaticollis*, Say; *Schaumii*, Lec., and *cana*, Newm., were also taken by beating. A single specimen of *Zeugophora scutellaris*, Suffr., was also taken by beating. *Metaparia clytroides*, Cr., was common both here and at Belvidere, Kiowa County. Four specimens of the rare *Dichoxenus setiger*, Horn, were taken at Rago, and one specimen at Garden City. This species was described from Texas. *Apion impunctistriatum*, Smith; *oblitum*, Smith, and *modestum*, Smith, were all taken by beating willows and sunflowers. *Cleonus canescens*, Lec., and *Copturus nanulus*, Lec., were two other *Curculionids* taken at Rago.

About a mile north-east of Belvidere, Kiowa County, is a salt marsh of considerable extent. Collecting there June 25th with Mr. Reist, we

found in abundance *Cicindelids*, *fulgida*, Say.; *sperata*, var. Lec.; *circumpicta*, Laf., and W. Horn's variety, *apicalis* of *togata*. In less numbers were found *macra*, Lec. The black variety of *Carpophilus pallipennis*, Say, was found in thistle heads at Belvidere. Three specimens of the beautiful *Chrysobothris purpureovittata*, Horn, were beaten from small elm shrubs. It is a rare Texan species. *Polyphylla Hammondi*, Lec., was also taken in considerable numbers. They were encountered flying just at nightfall, and continued their flight as late as ten o'clock. For so large an insect, they are swift flyers, and have to be taken quickly when they settle on a plant or on the grass. When taken, they make a very pronounced squeaking noise. Out of some sixty specimens captured, only one female was found. This preponderance of males is observed in other species of the *Scarabœidæ*. *Graphops varians*, Lec., the largest species of the genus, is taken sparingly at Belvidere. The colour varies from bronze to a greenish blue. A not uncommon *Crysomelid* taken here is *Zygogramma heterothecæ*, Linell. It is a handsome species. The *Meloid*, *Pyrota discoidea*, Lec., was common on the red flowers of a running vine. Another conspicuous species of the Texan fauna found here is *Cantharis fulvipennis*, Lec. It feeds on the Mexican poppy, and is easily taken. The pretty, bright green coloured *Otiorhynchid*, *Mitostylus tenuis*, Lec., was abundant June 24th, feeding on a small green species of ragweed. The rather large *Curculionid*, *Cleonopsis pulvereus*, Lec., is also taken at Belvidere. *Desmoris pervisus*, Deitz, and *Anthonomus alfopilosus*, Deitz, both occur here, and are taken by beating.

I have seen but two specimens of the rather odd-looking *Curculionid*, *Ampeloglypter longipennis*, Casey; one I took at Salina, Kansas, and the other was from Onaga, Kansas, taken by F. F. Crevecœur. The small *Scolytus*, *Monarthrum fasciatum*, Say, I took at Benedict, Wilson County, Kansas, on freshly-sawn lumber. I was also so fortunate as to secure at Benedict a single specimen of *Canthon perplexus*, Lec., a Texan species that resembles very closely *Canthon viridis*, Beauv. By the use of the beating net at Benedict, two specimens of *Fornax calceatus*, Say, were taken. They usually occur in numbers, when found, but I was not so fortunate as to discover a colony.

Blapstinus sulcatus, Lec., taken at Coolidge in June, is a Southern California species, south-west Kansas being its eastern limit.

SYSTEMATIC ARRANGEMENT OF THE NORTH AMERICAN LEPIDOPTERA.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

The first attempt at an arrangement of the N. Am. Lepidoptera, including a reform in the nomenclature, which I published in 1896[1], calls for some corrections. In the present list I have endeavoured to supply these, but, doubtless, there are others which have escaped me. Since 1896, Lord Walsingham and Mr. Durrant[2] have fixed the types of the genera *Tortrix*, *Tinea*, *Alucita* and *Pterophorus*, in the two former confirming my doubtful determination of 1895[3] and correcting the type of the last named genus to *monodactyla*. I have followed Dyar, in CAN. ENT., in using Hipocritidæ instead of Arctiidæ. I cannot find the sure type of *Geometra* or *Noctua*. I reject, however, the latter name, since it was differently used by Klein in 1753, and the assumption of 1758 as the basis of nomenclature is arbitrary. The present arrangement is based on that of the Syst. Lep. Hild., 1895. The views of Dyar with regard to the value of the larval tubercles are adopted. The superfamilies are regarded as parallel growths. It seems probable that the Hesperiades, Sphingides, Saturniades and Bombycides (Agrotides) are separate developments from the Tineid phylum. The subfamilies mark breaks in the sequence. This latter is arbitrary, but no scientific reason has been adduced for changing the general Linnæan plan, which is practically the most convenient. With regard to the family names, the oldest term, employed in a collective form and not preoccupied, is retained. At a time when new Catalogues are preparing, the publication of systems will be useful. The diurnals are arranged according to the diphyletic classification of 1897, the sequence and value of the groups are given by me in April, 1900[4]. With regard to the origin of the Lepidoptera, the Micropterygides show hymenopteriform and trichopteriform, the Hepialides neuropteriform characteristics.

LEPIDOPTERA.

Superfamily *Papilionides*, Grote emend. 1897.

Family Parnassiidæ.	Type Parnassius apollo, L.
Family Papilionidæ.	Type Papilio machaon, L.

1 Mitt. Roemer Mus., No. 7.
2 Ent. Month. Mag., 1897.
3 Systema Lep. Hild., August, 1895.
4 id. Zweite Folge.

Superfamily *Hesperiades*, Grote emend. 1897.

Family Pieridiдæ.	Type Pieris rapæ, L.
Family Nymphalidæ.	Type Nymphalis lucilla, L.
Family Libytheidæ.	Type Libythea celtis, F.
Family Riodinidæ.	Type Riodina lysippus, L.
Family Lycænidæ.	Type Lycæna meleager, Esp.
Family Hesperiadæ.	Type Hesperia malvæ, L.
Family Megathymidæ.	Type Megathymus yuccæ, B. & Lec.

Superfamily *Sphingides*.

Family Sphingidæ.	Type Sphinx ligustri, L.

Superfamily *Saturniades*, Grote, 1896.

Family Saturniadæ.	Type Saturnia pavonia major, L.
Family Citheroniadæ.	Type Citheronia regalis, F.

Superfamily *Bombycides* (Agrotides).

Family Lachneidæ.	Type Lachneis catax, L.
Family Hypogymnidæ.	Type Hypogymna morio, L.
Family Melalophidæ.	Type Melalopha curtula, L.
Family Ptilodontidæ.	Type Ptilodon camelina, L.
Family Platypterygidæ.	Type Platypteryx hamula, L.
Family Geometridæ.	Type Geometra papilionaria, L. (?)
Family Brephidæ.	Type Brephos parthenias, L.
Family Dioptidæ.	Type Dioptis cyma, Hübn.
Family Thyatiridæ.	Type Thyatira batis, L.
Family Nycteolidæ.	Type Nycteola degenerana, Hübn.
Family Lithosiadæ.	Type Lithosia complana, L.
Family Sphecomorphidæ.	Type Sphecomorpha incendiaria, Hübn.
Family Hipocritidæ.	Type Hipocrita jacobæa, L.
Family Pericopidæ.	Type Pericopis zerbina, Stoll.
Family Agaristidæ.	Type Agarista agricola, Don.
Family Apatelidæ[5].	Type Apatela aceris, L.

Superfamily *Tineides*, Grote, 1895.

Family Cochlidionidæ.	Type Coclidion limacodes, Hübn.
Family Megalopygidæ.	Type Megalopyge lanata, Cram.

5 This is (*Noctuæ* failing) the oldest collective term I can find, and I employ it for the whole group in sensu Lederer, etc. The group has been divided into families by Guenée and Herrich-Schaeffer (Agrotidæ, etc.).

Family Thyridæ.	Type Thyris fenestrella, Scop.
Family Pyromorphidæ.	Type Pyromorpha dimidiata, H.-S.
Family Pterophoridæ.	Type Pterophorus monodactyla, L.
Family Pyralididæ.	Type Pyralis pinguinalis, L.
Family Tortricidæ.	Type Tortrix viridana, L.
Family Sesiadæ.	Type Sesia culiciformis, L.
Family Cossidæ.	Type Cossus cossus, L.
Family Ptochopsychidæ.	Type Ptochopsyche Melsheimerii, Harris.
Family Psychidæ.	Type Psyche viciella, Schiff.
Family Adelidæ.	Type Adela Degeerella, L.
Family Tineidæ.	Type Tinea pellionella, L.
Family Orneodidæ.	Type Orneodes hexadactyla, L.

Superfamily *Micropterygides*, Grote, 1895.

Family Micropterygidæ.	Type Micropteryx Sparmannella, L.
Family Eriocephalidæ.	Type Eriocephalus calthella, L.

Superfamily *Hepialides*, Grote, 1895.

Family Hepialidæ.	Type Hepialus humuli, L.

THE LINNÆAN GENUS GRYLLUS.

BY JAMES A. G. REHN, PHILADELPHIA.

The Linnæan genus *Gryllus*, as first recognized in the tenth edition of Systema Naturæ, was composed of a number of sections which, while some have been recognized, are generally discarded. These names are used in the sense of subgenera, and as such are entitled to recognition. The case in hand being a deeply involved one, we must find some guide to be used as a standard in properly handling these names, and as to-day the Code of the American Ornithologists' Union is generally recognized as the *vade mecum*, we shall follow that. Canon XIX. of this Code is to the effect that a name "once established is never to be cancelled in any subsequent subdivision of the group, but retained in a restricted sense for one of the constituent portions." With this before us we must proceed to find on what a name should be retained. As was the case with the earlier writers (and is frequently the case with modern writers), Linnæus specified no types, and we must refer to the Code for help. Canon XXIV. informs us that "when no type is specified, the only

available method of fixing the original name to some part of the genus to which it was originally applied is by the process of elimination, subject to the single modification provided for by Canon XXIII." The last mentioned Canon is as follows: "If, however, the genus contains both exotic and non-exotic species—from the standpoint of the original author—and the generic term is one originally applied by the ancient Greeks or Romans, the process of elimination is to be restricted to the non-exotic species." Of the six Linnæan subgenera—*Mantis*, *Bulla*, *Acheta*, *Acrida*, *Tettigonia* and *Locusta*—four are classic: *Mantis*, *Acheta*, *Tettigonia* and *Locusta*.

The momentous question of the type of the blanket genus *Gryllus*, is now of importance, and, as Linnæus left no section of his genus as a restricted *Gryllus*, we are compelled to examine the subsequent writers for the first restriction of the genus to one of its component sections. De Geer (Mem., III., p. 505, 1773) is the first author who attempts to do this, and he considers that *Gryllus* should only be used for the subgenus *Acheta*, the last eliminated species of which is accordingly the type of *Gryllus*.

The treatment of each subgenus in detail will give a more comprehensive explanation.

MANTIS.

gigas	= *Eremoplana*, Stal, 1871.
phthisicus	= *Musonia*, Stal, 1877.
siccifolius	= *Phyllium*, Illiger, 1798.
gongylodes	= *Gongylus*, Thunberg, 1815.
religiosus.	
oratorius	= *Iris*, Saussure, 1872.
precarius	= *Stagmatoptera*, Burmeister, 1838.
bicornis	= *Schizocephala*, Serville, 1831.
tricolor	= *Harpax*, Serville, 1839.
strumarius	= *Chœradodis*, Serville, 1831.

As Linnæus really never considered any of the species as European, we must treat them all, the result being that *religiosus* is the type.

BULLA.

unicolor	= *Pneumora*, Thunberg, 1810.
variolosus	= *Pneumora*, Thunberg, 1810.
serratus	= *Prionolopha*, Stal, 1873.
carinatus	= *Xiphocera*, Latreille, 1825.

bipunctatus = *Tetrix*, Latreille, 1804.
subulatus = *Tetrix*, Latreille, 1804.

As will be seen from the above, *serratus* is the type of *Bulla*, it being the last one removed.

ACHETA.

—*gryllotalpa* = *Gryllotalpa*, Latreille, 1804.
—*domesticus*.
—*campestris* = *Liogryllus*, Saussure, 1877.
—*umbraculatus* = *Platyblemmus*, Serville, 1839.

In this and the succeeding classic genera, the non-exotic species are preceded by a dash. The type of *Acheta* (and accordingly of *Gryllus)* will be seen to be *domesticus*. As a name once used cannot be cancelled, the last eliminated species (aside from the type of *Gryllus)* must be considered as the type of *Acheta*, the result being that *Liogryllus* is a synonym of *Acheta*.

ACRIDA.

nasutus.
turritus.

The diversity of opinion regarding the use of the name *Acrida* is certainly rather singular. Mr. Scudder (Psyche VIII., p. 168) has given us his opinion on the subject, but some parts of it are rather misleading. The genus *Acrida* of Linnæus, as shown above, was based on *nasutus* and *turritus*. Fabricius included both of these species and also *brevicornis* in his genus *Tryxalis*, the result being that *brevicornis* is the type of *Tryxalis*, the other two species being the basis of *Acrida*. Brunner's genus *Metaleptea* is thus a synonym of *Tryxalis*, but not because of Stal's restriction as Scudder argues. The work of Stal was the logical outcome of a study of the original genera involved.

TETTIGONIA.

citrifolius = *Posidippus*, Stal, 1874.
laurifolius = *Microcentrum*, Scudder, 1862.
myrtifolius = *Ctenophlebia*, Stal, 1873.
elongatus = *Mecopoda*, Serville, 1831.
lamellatus = *Mecopoda*, Serville, 1831.
ocellatus = *Pterochroza*, Serville, 1831.
acuminatus = *Oxyprora*, Stal, 1873.
triops = *Conocephalus*, Thunberg, 1815.

rugosus = *Sathrophyllia*, Stal, 1874.
coronatus = *Acanthodis*, Serville, 1831.
aquilinus = *Brisilis*, Stal, 1873.
melanopterus = *Clonia*, Stal, 1874.
fastigiatus = *Gryllacris*, Serville, 1831.
coriaceus = *Moristus*, Stal, 1873.
—*viridissimus* = *Phasgonura*, Westwood, 1835.
—*verrucivorus* = *Decticus*, Serville, 1831.
pupus = *Hetrodes*, Fischer Waldheim, 1833.

Of the two species which are non-exotics, *viridissimus* is the most recently removed, and, therefore, the type of *Tettigonia*.

LOCUSTA.

elephas = *Pamphagus*, Thunberg, 1815.
cristatus = *Tropidacris*, Scudder, 1869.
morbillosus = *Phymateus*, Thunberg, 1815.
miliaris = *Aularches*, Stal, 1873.
hæmatopus = *Calliptamus*, Serville, 1831.
—*migratorius* = *Pachytylus*, Fieber, 1854.
—*tartaricus* = *Acridium*, Latreille, 1804.
variegatus = *Zonocerus*, Stal, 1873.
—*cærulescens* = *Œdipoda*, Latreille, 1825.
—*italicus* = *Calliptamus*, Serville, 1831.
—*stridulus* = *Psophus*, Fieber, 1854.
carolinus = *Dissosteira*, Scudder, 1876.
obscurus = *Pycnodictya*, Stal, 1873.
flavus = *Humbella*, Bolivar, 1881.
—*apricarius* = *Stenobothrus*, Fischer, 1854.
—*viridulus* = *Stenobothrus*, Fischer, 1854.
—*biguttulus* = *Stenobothrus*, Fischer, 1854.
—*rufus* = *Gomphocerus*, Thunberg, 1854.
—*grossus* = *Mecostethus*, Fieber, 1854.
—*pedestris* = *Podisma*, Latreille, 1829.

The papers of Fieber and Fischer are both seen to be 1854, for, though Fischer is dated 1853 on the title page, the preface is dated in November; but Fieber has priority, as Fischer refers to some of Fieber's genera, which were (as far as the writer can ascertain) not published previously. The types of *Locusta* are *apricarius*, *viridulus* and *biguttulus*, of which genus *Stenobothrus* becomes a synonym.

ON CERTAIN IDENTIFICATIONS IN THE GENUS ACRONYCTA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Prof. Smith has been to London, and now radically changes the synonymy in the genus Acronycta, which I had hoped was to have been finally settled in the revision which was published by him and myself. The changes involve the identification of three of Guenée's species and one of Walker's. As to *impleta*, Walk., we must accept Smith's identification as *luteicoma*, G. & R. I would suggest that the type ought now to be destroyed, lest future changes in the synonymy result. Guenée described eighteen species of Acronycta from North America, of which the larvæ of six were mentioned. In a genus like Acronycta, where the imagoes are so similar as not to be readily differentiated by description, while the larvæ are very diverse, the larval descriptions are relatively important. Of the three species now changed (*clarescens*, Gn.; *hamamelis*, Gn.; *brumosa*, Gn.), two have original larval descriptions. As to *clarescens* I have no comment, especially as Grote's first identification is now restored. But the others are different. *Hamamelis*, formerly referred to an oak-feeding species (*inclara*, Smith), is now transferred to *afflicta*, Grt. But Guenée's description contradicts *afflicta* in the colour of the hind wings, whereas it fits well the species named *subochrea* by Grote, better even than it fits *inclara*, and to this the larva also applies. As to *brumosa*, Smith says (Revision, p. 118) "the original description will fit either one of two or three species." The characterization of the larva should then be allowed to prevail and the name be referred to *inclara*.

I do not think that Guenée's types should be exclusively considered. Smith remarks (CAN. ENT., XXXII., 335) that *hamamelis*, Gn., is the same as *brumosa*, var. b; but Guenée described no variety b. So it is not unlikely that there has been some mixture of or addition to Guenée's types during the fifty years since they were described. I am, therefore, inclined to the following synonymy:

Brumosa, Guen.	Hamamelis, Guen.
inclara, Smith.	*subochrea*, Grt.

Afflicta and *persuasa* will remain good species as formerly, and thus two of Prof. Smith's changes can be avoided.

THE AMERICAN BEES OF THE GENUS ANDRENA DESCRIBED BY F. SMITH.

BY REV. F. D. MORICE AND T. D. A. COCKERELL.

[In 1891 Mr. Chas. Robertson wrote (Tr. Am. Ent. Soc., XVIII., 49): "After careful study, I have been unable to determine more than two of Smith's species" of *Andrena;* and went on to explain that Smith's descriptions omitted certain characters which were necessary for the exact determination of the species. It is probable that Mr. Robertson did not have before him many of Smith's species, and hence, naturally, could not recognize them in his material; but it is nevertheless true that the determination of Smithian *Andrenæ* from the description alone is often a matter of great uncertainty.

Under these circumstances, I ventured to ask the Rev. F. D. Morice, who has done such excellent work on European *Andrenæ*, if he would examine Smith's types in the British Museum, and report on certain characters which I enumerated. This he has kindly done. Writing under date, January 29, he says: "I have been in London for a few days and examined Smith's *Andrena* types at the British Museum. Here are the notes I made upon them. I could not always get a really satisfactory view of the labrum, but have done my best. Some specimens are very dirty, and the light in the insect room is not good for minute investigations. In each case the specimen described is that which bears a label stating it to be the 'type' of the species. With *fastuosa* (♀) is placed a ♂, apparently belonging to it, but I do not know whether the latter has ever been described. I could only find a description of the ♀. Pray use my notes just as you please." In the following article, the notes by Mr. Morice are all included within inverted commas, and will thus be easily distinguished from my own comments.—T. D. A. C.]

Andrena aliena, Smith, 1853.

♀. "Area transversely striated; abdomen greasy, but seems to be smooth between the punctures; tubercle emarginate." Here and in all the notes given below, "area" means the basal area of the metathorax, propodeum, or median segment. "Tubercle" means the basal tubercle or process of the labrum.

This species, from Florida, would seem to fall close to *A. Forbesii*, Rob., but it is evidently not the same.

Andrena victima, Smith, 1853.

♀. "Tubercle truncate; area rugose at its base; abdomen punctured like *trimmerana*, not the least like *convexiuscula*."

♂. "Apical ventral valve emarginate, and genitalia like *rosæ* or *florea;* antennal joint 3 and those following subequal." This ♂ is the type of *A. desponsa*, Sm., which Mr. Morice says is no doubt the opposite sex of *victima*, as Smith suspected. "I think it is *trimmerana*, or close to it." Type locality, Nova Scotia.

In many respects this resembles *Macgillivrayi*, Ckll., but in that the tubercle is by no means truncate. Smith's description of *victima* ♀ seems to suggest that the anal fimbria is fulvous; in *trimmerana* (which also appears to be a larger insect) it is black.

Andrena integra, Smith, 1853.

♀. "(Type.) Tubercle roundly truncate; clypeus granulose and punctured; area obliquely strigose (about as coarsely as *labialis*), with no raised border; abdomen shining, with distinct but very fine delicate punctures, apices polished and reddish. One at least of the specimens under this name is evidently different, with emarginate tubercle and rugulose abdomen." Described from "United States."

This almost agrees with *A. serotina*, Rob., but the shining abdomen may separate it. *A. lauracea*, Rob., is also similar, but has the tubercle emarginate. *A. spiræana*, Rob., differs by the sharp ridge bounding the area behind.

Andrena simplex, Smith, 1853.

♀. "Tubercle truncate; specimen very old and dirty, but area seems to be dull, very finely rugulose or granulated; abdomen finely reticulate all over and also punctured, of an obscure red (perhaps only faded?), much narrower than the abdomen of *fuscata*, with which Smith compares it; it reminds me rather of *analis* or *chrysosceles*." Described from "U. S."

This seem to be different from anything seen by me.

Andrena clypeata, Smith, 1853 (nec Brullé).

"Like a small specimen of *chrysosceles;* tubercle truncate; area hid by hairs and grease, *seems* ill-defined; abdomen aciculated, and I should say not punctured, but it is very dirty in both the two specimens, reddish like the last species." The type is a ♂ from Florida; the name, being preoccupied, has been changed by Dalla Torre to *clypeolata*.

This is very like *A. ziziæ*, Rob.; should it be the same, *ziziæ* has priority over *clypeolata*.

(To be continued.)

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BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Ft. Collins, Colorado.

LEPIDOPTERA (in papers) of any foreign country wanted in exchange for same of this vicinity. Send an assortment and receive same quantity. JOHN COMSTOCK, 1572 Ridge Ave., Evanston, Ill., U. S. A.

I WILL exchange a few live pupæ of Gloveri, Regalis and Inscripta, also fertile ova of Yama-mai and other Japanese moths, for live pupæ of rare Sphinges and other moths. JAMES L. MITCHELL, 212 Indiana Trust Building, Indianapolis, Indiana.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabaeidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelpha.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII. LONDON, MAY, 1901. No. 5

SOME RECENT WORK IN THE GENUS CATOCALA.

BY OTHO C. POLING, QUINCY, ILL.

Since the revision of this genus by the late Dr. Hulst, in 1884, contributions to our knowledge have not been extensive, while the material gathered in recent years has been very great. The popularity of the genus among students of Lepidoptera had made the necessity for a revision very keenly felt, so that when Prof. French generously undertook the work, a year or so ago, a feeling of gratitude was aroused by enthusiasts, who have known the thoroughness with which his work would be attended.

In offering him my assistance, I placed at his disposal a large number of Western forms, many of them from remote localities where no great amount of collecting in this genus had yet been done. I was not greatly surprised when my own opinion of some apparently new species was confirmed by that of Prof. French. Though reluctant about presenting these new forms until more material could be gathered for a more thorough study and comparison, I have consented to do so, since the assistance offered me by a more competent scholar has enabled me to bestow full credit for the work on Prof. French, who wrote the descriptions and modestly declined to "deprive me of the pleasure of naming my new forms."

Such sincerity is in marked contrast with some modern methods, where the object of contributing to our knowledge of science is lost sight of in the keen desire for personal prominence.

Catocala Frenchii, n. sp.

Expanse of male, 2.50 inches; of female, 2.75 inches.

General or ground colour, pale glaucous gray, sprinkled over with black or dark brown atoms, so as to make the general aspect a pale blackish, rather than a brownish tinge, differing in that respect from *C. Californica*. Lines distinct; basal line black, single, with a whitish

shading outside ; t. a. line black, double ; in the female the space between this and the basal line heavily shaded, with the inner part of the line broken on the subcostal and median veins, and the whitish shading reaching the basal line in the form of a triangle ; outer part of t. a. line much heavier than the inner, the enclosed space whitish, the line strongly dentate in two outer and two inner teeth, in this much like *C. Californica*, but the teeth sharper. T. p. line double, distinct, the two extra discal teeth nearly equal, inner part of line heavy, black, outer part brown, shading into the subterminal brown shade which is faint and indistinct ; s. t. line broken, also its white anterior shade, dentate, the outer dentations capping the white shade, the inner teeth mostly wanting in the line and faint in the white, towards the posterior angle the teeth form dashes with the intervenular lunules ; the lunules distinct ; the reniform brown, with a black annulus, situated in a blackish cloud ; subreniform white, more or less sprinkled with dark scales, pyriform with a point projecting towards base of wing from the upper inner part, closed, with the line connecting with the t. p. line sometimes indistinct ; preceding the reniform is a white or whitish space in the discal cell that reaches the t. a. line in a point ; it is whitish also outside or beyond the reniform to the t. p. line, though this is more indistinct than the white in the cell ; there is also a whitish space outside the t. p. line below the extra-discal teeth ; fringe gray, with a blackish line through the middle. Hind wings red, about the shade of *C. Californica*, slightly smoky at the base and the fringe of the inner margin ; median band nearly straight, of medium width, much like the band on *Californica*, slightly constricted in the middle, bent a little at posterior end, but not narrowed into a hook as in *Strechii*, ends abruptly about one-eighth inch before inner margin, without shade in either sex connecting with the margin ; marginal band wide, inner edge straight, to opposite end of median band, then with two prominent teeth, between which is a cavity reaching one-third the distance to outer edge ; apex white, slightly yellowish, but without red, the white space narrow, no other white outside the band ; fringe white, with a gray line that is not distinct throughout.

The thorax and abdomen as in allied species. The under side much as in *C. Californica ;* fore wings without tinge of red ; the s. t. white band quite narrow in its posterior third, a sharp but not long angle on submedian vein ; hind wings with inner two-thirds of light part red ; bands as above, but dentations of marginal band less distinct.

The above description is taken from two examples, one in collection of G. H. French, the other in the collection of O. C. Poling. They were taken at New Westminster, B. C., Canada.

This species belongs to the *Californica* group, resembling that species in size, and the bands of the hind wings; but it differs in having the ground colour more of a blue or glaucous gray, the markings more distinct, and a duller red to the hind wings, a deeper excavation in terminal band of hind wings near anal angle. The subreniform is nearly or quite separated from the t. p. line.

Catocala chiricahua, n. sp.

Expanse, 2.75 inches.

Colour gray, in places near the apex, and along the posterior margin, nearly as pale as the ground colour of *C. Robinsonii;* with a deep brown broken shade, not at first noticeable, extending from middle of base to apex, similar to that found in same examples of *C. innubens*, but a much brighter and deeper brown; all lines deep brownish black, prominent; basal line distinct, extending obliquely outward below the median vein to the submedian, and thence along this in a shade; t. a. line single, very broad on the costa, gradually narrowing to median vein, from which it extends to middle of posterior margin in about uniform width, with only one tooth pointing inward on internal vein, the line before the tooth a gradual curve with the convex side out; the space inside the t. a. line brown, except along posterior margin, the brown deeper in the centre, a small gray spot just outside the basal line below the median vein; t. p. line single, broad, shading inward somewhat, the extra-discal teeth extending well into the s. t. brown shade, subequal, the inflexion on submedian vein sharp, closed, extending almost to t. a. line; s. t. line nearly obsolete, as also its preceding whitish shade; terminal lunules scarcely more than dots; reniform brown, centre paler, a whitish annulus, with a median shade obliquely above the reniform, with the lower part of reniform in the edge of the central longitudinal shade that runs through the wing, the outer part with four more or less distinct teeth; subreniform prominent, rather wide open, white to the s. t. brown shade sprinkled with pale brown scales; scales of the s. t. brown shade and subreniform yellowish brown, those of the longitudinal shade mostly vandyke brown; in the cell and separated from it by its black annulus is an oblique white space or patch, not quite so large as the subreniform, that has a few brown scales, making with the subreniform an oblique whitish stripe from

near the subcostal vein to the s. t. brown shade ; the s. t. brown shade a little pale below the teeth of the t. p. line ; fringe gray, with a very little pale at the base.

Hind wings rich rosy crimson, about the colour of *violenta* and *Verilliana*, smoky at the base ; median band of medium width, wavy, almost broken by a sharp excavation on submedian vein, a few red scales between the line and the inner margin, where it ends a point of a triangle, the band is broad on the costa ; terminal band broad, inner edge slightly wavy, not excavate before anal angle ; apex very narrow, red ; a few red dots on edge of wing between the veins outside the terminal band, just before anal angle a narrow red patch with the fringe at this point also red; elsewhere, fringe at apex white faintly rose tinted ; the rest of fringe black, with a little rosy white where the red dots are.

Under side with the black bands broad, the median of hind wings not reaching internal margin except by a faint shade ; the light bands of fore wings rosy, with white on the costa of the outer one ; posterior two-thirds of hind wings rosy red, the anterior part of outer band white with a rosy tint, the anterior part of base gray. Body as in allied species.

Described from one female from Southern Arizona, in the collection of O. C. Poling, Quincy, Ill. It stands between *aholibah*, Strecker, and *violenta*, Hy. Edw. The hind wings are more like *violenta*, of a brighter red than *aholibah*.

The shade of fore wings is much like that of *aholibah*, but brighter, and the s. t. brown shade much lighter. It is in general a much brighter insect than *aholibah*. It is much larger than *violenta*, and differs from *aholibah*, *violenta* and *Verilliana* in having a wide open subreniform.

Catocala fratercula, var. OUWAH., n. var.

This form, taken at Quincy, Ill., is between var. *gisela* and var. *Jacquenetta*.

The general tint is brownish gray, the brown of the vandyke type instead of olivaceous ; pale gray in the cell before the reniform ; a deep brown longitudinal shade runs from the base to the apex, that is broken only by the subreniform being a little paler, the whitish shade preceding the s. t. line broken by this shade. It differs from *gisela* in the base along the posterior margin and the terminal margin not being pale, and in the central shade being more distinct. The hind wings resemble *gisela*, but the anterior part of the median band is wider than in *gisela*.

Described from one specimen in the collection of O. C. Poling.

Parthenos nubilis, var. APACHE, n. var.

Smaller and much paler than the northern form. Markings of fore wings do not differ from those of the typical form. Hind wings pale yellow. All bands much reduced. Heavy black marginal band of the northern form is only represented by a few black scales on the veins, while all the space between veins is yellow. Submarginal band indistinct, nearly disappearing before it reaches upper margin.

Easily distinguished at a glance from the northern form by the row of dots which replaces marginal band and other characters above mentioned. Types, seven examples in the collection of Dr. William Barnes, of Decatur, and that of the writer.

NEW NORTH AMERICAN ORTHOPTERA.

BY A. P. MORSE, WELLESLEY, MASS.

ODONTOXIPHIDIUM, gen. nov.—Allied to *Ziphidium*, from which it is probably derived. Distinguished from that genus by the form of the anal cerci of the male, which are elongate, straight, with the lateral tooth reduced in size, and an additional tooth upon the dorsal side near the base; and, in the type, by the form of the pronotum, which is sub-sellate and prolonged backward, covering the base of the abdomen both above and on the sides, in correlation with the absence of flight-organs. The type is *O. apterum*, described below.

Odontoxiphidium apterum, sp. nov.—Pronotum sub-sellate, the dorsum straight (♂) or slightly convex (♀) in longisection, smoothly convex in transection, the sutures nearly obsolete, the lateral canthi entirely lacking; posterior margin of lateral lobe nearly straight, passing into the posterior margin of hind process with a barely perceptible sinuosity at an angle of 45° with the dorsum when viewed from the side. Tegmina and wings absent in ♀, tegmina alone present in ♂, covered at base for one-third to one-half their length by the pronotum, the exposed portion one-half to two-thirds as long as the pronotum, vaulted, even the speculum convex, opaque, and abbreviated. Hind femora very stout, almost bulbous, at base. Cerci of ♂ straight, slender, evenly tapering, about as long as the last two segments on the dorsum, the usual lateral, inwardly directed tooth small, about two-thirds as long as apex of cercus and borne at base of distal third, the stem of the cercus (proximal two-thirds) elongate and bearing an additional, dorsally-directed denticle

about midway between the lateral tooth and the base. Supra-anal plate of the ♂ with the posterior process narrow, sub-quadrate, the apical angles rounded, the entire process usually strongly deflexed. Ovipositor straight, about five-sixths as long as the hind femora, acute and symmetrical at tip.

Body: ♂, 11–13; ♀, 11–18. Pron.: ♂, 3.5–4; ♀, 4.5–5.3. Teg.: ♂, 2–3. Post. fem.: ♂, 10–12; ♀, 13–15. Ant.: ♂, 45–60; ♀, 45–50. Ovip.: 10.5–12 mm.

Rusty or olivaceous above, the face and sides of body greenish. A well-marked brown, median dorsal band sometimes present, bordered on each side by a narrow pale line. Sides of abdomen of male sometimes more or less infuscated. Abdomen of young marked with a conspicuous, broad, median fuscous band.

Twelve ♂, fifteen ♀, two young, Aug. 15–Sept. 5, Hastings, Fla. (Brown); 1 ♀, Sandford, Fla., G. B. Frazer (Scudder).

Scudderia cuneata, sp. nov.—In dorsal view the anal segment of the male resembling that of *furcata* (see Scudder, Proc. A.A.A.S., 1898, fig. 8), but with the excavation at apex deeper, twice as deep as its middle width, the sides sub-parallel or slightly approximated distally from the middle, convergent to a very bluntly rounded apex at base of furcation; limbs of the furcula relatively slender, slightly approximate at tip, obliquely depressed. In lateral view similar to *Mexicana*, but with the furcula narrow and sub-acute at tip and the subapical flanges appearing as if truncate, the emargination reduced to a shallow excavation, the outline of the apex as a whole roughly cuneate. Sub-genital plate reaching tip of anal segment, strongly arcuate, rather slender.

Pronotum with parallel sides and distinct lateral canthi. Posterior femora spinulose, the spines three in number on outer, six on inner edge, very small, black. Tegmina long and narrow, apex rounded.

Body: ♂, 22. Post. fem.: 25. Teg.: 30x5.5. Wings pass teg.: 5. Ant.: 45 mm.

Green. Antennæ, tarsi and apices of tibiæ of anterior and middle legs, dorsal margin of tibia opposite sense organ, and lateral canthi of pronotum, rufo-flavescent, palest on pronotum, darkest on tarsi. Posterior tarsi and apical seven-eighths of tibiæ infuscated.

One ♂, Alabama (Baker).

Hesperotettix Floridensis, sp. nov.—Resembling *H. speciosus* (from which it is readily distinguished by the shorter tegmina), but rather

smaller, the pronotum more finely rugulose, the mid-carina less pronounced and nearly or quite obsolete on the prozona. Tegmina ovate, about two-thirds as long as wide. Furcula variable, consisting usually of a pair of minute rounded lobes nearly as wide and long as the width of last dorsal segment at their base, but sometimes obsolete. Cerci resembling those of *speciosus*, but more finely pointed, twice as long as their width at base, the basal three-fifths tapering evenly, the distal two-fifths equal, acutely pointed, straight or a little incurved. Female with both valves of the ovipositor slender, their ento-horizontal contours relatively straight, and both dorsal and ventral scoops elongate.

Body: ♂, 17 5-21; ♀, 24-30. Post. fem.: ♂, 11.5-13; ♀, 15-16. Teg.: ♂, 4.5-6; ♀, 5-7. Ant.: ♂, ♀, 8-10 mm.

Grass-green, yellowish beneath, with more or less rufous on the anterior faces of the anterior and middle femora and the dorsal carina of the external face of the posterior femora. Posterior tibiæ bluish-green.

Fourteen ♂, four ♀, Aug. 15-28, Hastings, Fla. (Brown).

The following key may be added to that of Scudder—Rev. Melanopli, p. 57—under A^2:

b^1. Tegmina elongate, two to five times as long as broad, roundly acuminate at tip. *H. speciosus.*

b^2. Tegmina ovate, at most one and one-half times as long as wide *H. Floridensis.*

CANNIBALISM AMONG CATERPILLARS.

The following interesting notes upon this subject are taken from a paper recently received from Mr. L. de Nicéville, of Calcutta*:

"The larvæ of many kinds of butterflies will, when they cannot get vegetable food, eat each other or soft, newly-formed pupæ. Mr. Bell has found that the greatest cannibals in this respect are the larvæ of certain Lycænidæ, and the worst among these, again, are the larvæ of *Zesius chrysomallus*, Hübn., for these will at times, even when plentifully supplied with their proper vegetable food, eat any larvæ which may be in a fit state to be eaten; *i.e.*, which are either on the point of casting their skins, have just cast them, or are just going to pupate. The Lycænid larvæ, which

*"The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency, with a revision of the Species of Butterflies there Occurring"; by Lionel de Niceville, F. E. S., etc. Reprinted from the Journal, Asiatic Society of Bengal, Vol. LXIX., Part ij., No. 2, 1900, pp. 187-278.

are most addicted, after that of *Z. chrysomallus*, are those of the *Amblypodia* and *Tajuria* groups, those of *Arrhopala* and *Rapala* being nearly as bad. He has known one larva of *Tajuria cippus*, Fabr., to eat up over a dozen young ones of its own species. In Kashmir Mr. Bell bred a single imago of *Hysudra selira*, Moore, from a larva which had been reared on the dead leaves and flowers of its food-plant, *Indigofera atropurpurea*, Hamilt. (Natural Order Leguminosæ), together with several newly-formed pupæ of its own species. The imago was a very fine, large specimen, so that the insect diet evidently agreed with the larva. Mr. Bell particularly noticed this fact, as in all his previous experience he had been led to the conclusion that a cannabal diet was bad for the stomachs of the larvæ practising the habit of eating up their fellows, as they, as a general rule, have not been healthy, and have died before pupating.

"The tendency to cannibalism is not confined to the *Lycænidæ*, but exists also amongst the *Pierinæ*; the larvæ of *Appias* will eat each other and any other species of larva feeding on the same food-plant as themselves, if forced to it by hunger. He has seen the larvæ of *Appias libythea*, Fabr., and *A. taprobana*, Moore, eat freshly-formed pupæ of their own species, as well as larvæ changing their skins, and also the larvæ and pupæ of *Leptosia xiphia*, Fabr. Some of the caterpillars of the *Danainæ* will, when food is not to be had, eat individuals of their own species.

"Mr. Bell has never known a larva to eat another larva feeding on a food-plant of a species different from its own, so it is probable that all larvæ taste strongly of the plant they feed on, and it is also probable that cannibal larvæ are hardly conscious that they are eating up each other, being only guided to their proper food by the sense of taste, or possibly to a less extent by the sense of smell. None of the larvæ of the *Satyrinæ*, *Elymniinæ*, *Amathusiinæ*, *Acræinæ*, *Nymphalinæ*, *Libythæinæ*, *Nemeobiinæ*, *Papilioninæ** or *Hesperiidæ* have been found by Mr. Bell to eat anything but vegetable food. All rhopalocerous larvæ, however, with but very few exceptions, eat their own cast-off skins while these are still soft and moist; and the young larvæ on emerging from the egg will almost invariably, under normal conditions, make their first meal off the empty egg-shell. He notes that all the butterfly larvæ he has bred change their skins five times from the time they leave the egg to the time they turn to pupæ."

*The larvæ of *Papilio philenor*, Linn., whose food-plant is *Aristolochia sipho*, have been known to devour their comrades in captivity when supplies ran short.—Ed.

ON SOME BEES OF THE GENUS AUGOCHLORA.

BY E. S. G. TITUS, FORT COLLINS, COLO.

Augochlora Coloradensis, n. sp. (subg. *Augochlora*).

♀.—Green, often tinged with purple; face finely and confluently punctured above the base of the antennæ, more coarsely, confluently so below, supraclypeal space sometimes not confluently punctured; clypeus with large punctures, black at tip; basal process of labrum subquadrate, broadly rounded, rufopiceous; mandibles black, rufous at tips; antennæ black, flagellum near the tip fulvotestaceous beneath; striation of the disc of the metathorax reaching to the summit, posterior truncation rounded above, lateral portions rounded, truncation not shining, rugosely punctured; tegulæ, often with a black dot in the centre, stigma and nervures testaceous; legs piceous, femora and tibiæ sometimes with a greenish cast, knees testaceous, tips of tarsi generally inclined to rufous; hind tibial spurs of posterior leg finely serrated; abdomen shining, polished, finely punctured; ventral segments black; *pubescence* of face, sides of thorax, tarsi partly, and abdomen, whitish; scutellum and first dorsal abdominal segments very fine and short, margins of segments fringed with white hairs; hair on tarsi often inclined to be rufous. Length, 6–7 mm.

♂.—Green; clypeus sometimes confluently punctured, slightly produced, anterior edge of clypeus and posterior portion of labrum white, labrum polished, testaceous anteriorly, slightly notched at tip; mandibles black at base, yellowish in middle and distinctly rufous at tips; antennæ black, flagellum, except last joint, yellowish testaceous beneath; thorax finely closely punctured, with the impressed lateral and central longitudinal lines smooth and distinct; striation of disc of metathorax as in female; posterior truncation distinctly bounded by carina; groove shallow; tegulæ, stigma and nervures testaceous, wings hyaline; legs green, knees testaceous, anterior tibiæ with the green restricted to a line posteriorly, two posterior pairs of tibiæ at the tips, and all the tarsi, darker toward tips, yellowish testaceous; abdomen shining, rather closely and finely punctured, apical portion of first segment somewhat constricted; ventral segments black, fourth widely emarginate; face, clypeus, cheeks, scutellum, legs and abdomen dorsally, sparsely clothed with whitish pubescence, ventral segments with fine short sparse white pubescence. Length, 5–6 mm.

Described from numerous females: Ft. Collins (5,000 ft.) and Boulder in May and June, Ft. Lupton (4,500 ft.) in July; and two males

on *Aster commutatus* at Ft. Collins, Colo., August 29. Females were taken on *Helianthus annuus* and *Malvastrum coccineum*.

A specimen from Ft. Lupton, Colo., has the second submarginal cells very narrow and also narrowed above; and one of the male specimens has the second submarginal cell in the left wing petiolate, the first and second transverse nervures being coalescent for one-third of their length above, the first recurrent nervure entering the second submarginal cell near the middle in both wings.

This species is closely related to *A. pura*, Say, *A. similis*, Robt., and *A. confusa*, Robt.; but seems to be easily separated from the descriptions of either of them. I have an Augochlora from Mr. E. P. Van Duzee, taken at Colden, N. Y., which answers to the description of *pura*, Say.

A. Coloradensis may be separated from *A. pura*, Say, by colour of thoracic pubescence, base of mandibles with no green spot, abdominal segments never margined with black; from *A. confusa*, Robt., by the less metallic tibiæ and tarsi; from *A. similis*, Robt., by the pure green colour, abdominal segments not at all testaceous. Although near *A. neglectula*, Ckll., it is a narrower species and also differs in colour and pubescence. I possess two specimens from Elmdale, Mich., that I believe are referable to *A. similis*, Robt.

Augochlora neglectula, Ckll. (subg. *Augochlora*).

A. neglectula, Ckll. Bull. 24, N. Mex. Agrl. Stat., Aug., 1897, p. 43.

Two female specimens: Ft. Collins, Oct. 17, and Greeley, Sept. 17. The former was taken on *Chrysopsis villosus*. This is a bluer species than *A. Coloradensis*, and the flagellum of the antennæ is uniformly pale. There are New Mexico specimens in our collection presented by Prof. Cockerell.

Augochlora humeralis, Patton (subg. *Augochloropsis*, Ckll.).

A. humeralis, Patton. Bull. U. S. Geog. Surv., 1879, p. 365, n. 3. Ashmead, Bull. 1, Colo. Biol. Assoc., 1890, p. 31.

This species has been recorded from the State, but I have seen no specimens from Colorado that I can refer to it. Specimens from Onaga, Ks., (F. F. Crevecoeur) answer to Patton's descriptions. Mr. Ashmead very kindly examined specimens in the U. S. N. M. of *A. humeralis*, Pat. marked "N. W. Kans., Williston," and writes me that the hind spur of the hind tibiæ of the ♀ has but *three* spines.

Augochlora cleomis, n. sp. (sub. *Augochloropsis*, Ckll.). Fig. 6.

♀.—Blue-green; face above antennæ very finely confluently punctured, below antennæ more coarsely so; clypeus black at tip, punctures

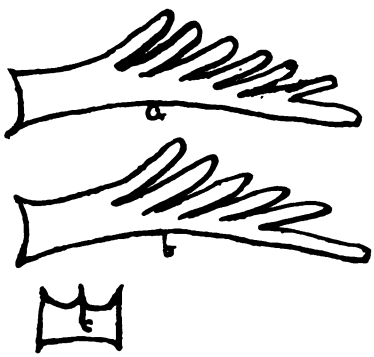


FIG. 6.—*a* Hind tibial spur of *A. cleomis*, female.
b Hind tibial spur of *A. cærulea*, female.
c Fourth ventral segment of *A. cleomis*, male.

large and deep; labrum rufotestaceous; mandibles black with a green spot at base, rufous in middle and darker at tips; antennæ black, flagellum dark rufotestaceous beneath; prothoracic angles sharp, tubercles prominent; mesathorax very closely and finely punctured anteriorly, more sparsely so posteriorly; postscutellum with some larger separate punctures; metathoracic disc roughened, posterior truncation rounded above, distinctly punctured, lateral angles sharp, median groove shallow; tegulæ green, with a black spot shading into yellowish testaceous on the outer edges; wings hyaline, nervures and stigma yellowish testaceous, costal nervure of anterior wings very dark; anterior and middle femora and all the tibiæ blue-green, posterior femora piceous, all the tarsi testaceous, hind tibial spur of hind legs with *six* spinous processes; all the tarsi, two posterior pairs of tibiæ and hind femora with dense pale pubescence; abdomen closely finely punctured, covered with short pale hairs, apical margins of first and second segments depressed slightly, fringed with short pubescence, ventral segments reflecting blue-green, densely pubescent; thorax, scutellum, postscutellum, behind tubercles, behind wings, and along the lateral sides of the posterior truncation with pale ochraceous pubescence, face clothed with short pale pubescence, cheeks with long white pubescence. Length, 8 mm.

♂.—Resembles the female; clypeus strongly produced, entirely green; labrum dark rufopiceous; flagellum testaceous beneath; tegulæ with more yellow than in female and with no black spot; mesothorax more closely punctured; legs green, tarsi *yellow*, testaceous at tips, legs with pale pubescence; abdomen shining, closely punctured, pubescence as in female, but the short pale pubescence of the segments is heaviest near the apical margins of the segments; fourth ventral segments so produced posteriorly in the middle as to form two deep curves on each side (see drawing). Length, 9 mm.

Described from a male (Aug. 19) and a female (July 17) taken on *Cleome serratula,* in Horsetooth Gulch, near Ft. Collins, at an altitude of *over 7,000 ft.*

This species differs from *A. humeralis*, Patt., as identified by specimens in the collection here, by the pale ochraceous pubescence, prothoracic margin not sinuous, posterior truncation not shining, median groove shallow, legs blue-green, not black beneath, hind tibial spur of female; colour of tegulæ; and first three ventral segments being green. The male most resembles *A. fervidus*, Smith, but that is described as having long white hair on the legs, and tarsi pale testaceous with yellow hair.

Augochlora cærulea, Ashm. (subg. *Augochloropsis*, Ckll.).

Agapostemon cæruleus, Ashmead. Bull. 1, Col. Biol. Assoc., 1890, p. 7.

♂.—Entirely blue; pubescence rather dense, short, appressed, whitish, denser on face, and on apices of first and second abdominal segments, where it is longer and forms yellowish ochraceous hair-bands; face and occiput, excepting clypeus and supraclypeal space, very closely densely punctured; clypeus with elongate shallow separate punctures, and slightly produced, hardly truncate at tip, shining; supraclypeal space with round separate punctures; face and cheeks with rather long dense white hairs; mandibles with a green spot at base, rufous in middle and with darker tips; only the scape and three joints of the flagellum remain; the original description reads: "Antennæ ferruginous, blackish above." Prothoracic angles sharp, more prolonged than in *A. cleomis*, joining the prominent green tubercles by a curved line, which is fringed with short hairs; mesothorax finely closely punctured; scutellum with fine punctures, not very close in centre; postscutellum finely confluently punctured; disc of metathorax shining, green, punctured, lateral angles sharp, base of

metathorax very finely punctured except around the posterior edge and sides, where the punctures are *very few* and scattered; sides of metathorax finely confluently punctured, base distinctly enclosed; thorax on sides and beneath, scutellum, behind tubercles, with medium ochraceous hairs; tegulæ deep blue-green, smooth in centre; wings hyaline, nervures and stigma testaceous; legs blue-green, tarsi yellowish testaceous, darker at tips; anterior and middle legs fringed with pale pubescence, becoming somewhat rufous near the tips of the tarsi; posterior legs wanting; abdomen dorsally, purple, finely closely punctured, entirely covered with short pale hairs, four apical segments more densely pubescent; fourth ventral segment as in *A. cleomis*, but the curvatures are not nearly so deep; first, second and third ventral segments densely, closely punctured, violet blue, posterior margin of second and third with a triangular space in the centre, extended narrowly along the sides, smooth and testaceous, remaining segments black, venter with very short hair. Length, 11 mm.

♀.—Resembles the male closely; pubescence dense on sides of face, cheeks, beneath, and clypeus, behind wings, on scutellum and pleura, quite dense; thorax closely, finely, partly confluently punctured, pleura more coarsely so; metathorax with a faint trace of triangle, truncation shining, punctured; tegulæ green with an impunctate wide outer margin; legs green, femora darker beneath, tarsi and tibiæ piceous, inclined to ferruginous at tips; anterior and posterior legs and middle tarsi with dense pale pubescence; hind spur of hind tibiæ pectinate with *five* pointed spines; venter piceous, with a decided bluish tinge, margins of segments testaceous, fringed with hair. Length, 10 mm.

Male taken at Denver, Colorado, by Mr. Horace G. Smith, and is in Mr. Ashmead's collection. Through the kindness of Mr. Ashmead, I have had the type specimen to examine. The female was taken at Ft. Lupton, Colo., (R. Haynes) and is now first described.

I wish to express my thanks to Prof. Cockerell and Mr. Wm. H. Ashmead for the many favours I have received from them during the preparation of this article.

On October 30th, 1900, at 8.25 a. m., I watched the emergence of a male *Vanessa antiopa* from its chrysalis. The temperature was 51°, with a stiff breeze blowing. The chrysalis was under the ledge of a fence and had been exposed to several degrees of frost. Several of the same species emerged during the previous week. A. E. NORRIS, Montreal.

THREE NEW PARASITIC HYMENOPTERA FROM SOUTH AFRICA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DIVISION OF INSECTS, U. S. NATIONAL MUSEUM.

Prof. Charles P. Loundsbury, Government Entomologist, of Cape Town, South Africa, has recently sent to Dr. L. O. Howard, U. S. Entomologist, a lot of bred parasitic Hymenoptera for names, among which were found three new species, which, at the request of Dr. Howard, are characterized below :

Family LVII.—PLATYGASTERIDÆ.

Genus Allotropa, Förster.

(1) *Allotropa Loundsburyi*, new species.

♀.—Length, 0.9 mm. Polished black ; antennæ and legs mostly brown or brown-black, the base of the scape, pedicel, funicle joints 1 to 4, trochanters, knees, base of tibiæ, the tarsi except last joint, and the petiole of abdomen, yellow. Wings hyaline, entirely veinless, except the subcostal vein which terminates in a small knob.

The antennæ are 8- or 9-jointed, depending upon whether the enlarged antepenultimate joint is counted as a single joint or as two closely-united joints ; funicle joints 1 to 4 much slenderer than the pedicel or joints 5 and 6 of funicle, the first joint being not quite twice as long as thick, the second shorter, the first and fourth subequal, subquadrate. The abdomen elongate, conically pointed, about one-third longer than the head and thorax united, the petiole very short, wider than long, while the second segment is large and occupies about half of the whole surface of the abdomen.

♂.—Length, about 0.8 mm. Agrees well in colour with the female, but differs in having the antennæ distinctly 9-jointed, the joints being distinctly separated, the flagellum filiform, the joints oblong, with whorls of sparse long hairs, while the abdomen is oblong oval, not pointed at apex and not longer than the thorax.

Type.—Cat. No. 5727, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch. : *Dactylopius* sp. on Gorse.

Bred by Prof. Chas. P. Loundsbury, Oct. 22, 1898.

The Platygasterids, so far as we know, are parasitic only upon Dipterous insects, and probably this species will be found to be a hyperparasite upon a Dipteron infesting the scale insect.

Family LXVII.—ENCYRTIDÆ.

Genus Coccidencyrtus, Ashmead.

(2) *Coccidencyrtus flavus*, new species.

♀.—Length, 0.8 mm. Golden yellow; legs yellowish white; antennal club brown; eyes brown-black. Wings hyaline, the marginal vein punctiform, not longer than thick, the postmarginal scarcely longer than the radius or stigmal vein; the stigmal vein, although comparatively short, is fully twice as long as the punctiform marginal vein and terminates in a little knob.

The flagellum is subclavate, the funicle 6-jointed, the joints submoniliform, increasing in width and size to the club, the first three or four joints being very small, narrower than the pedicel, the sixth about as wide as the pedicel, the club stouter, cone-shaped and as long as, or a little longer than, funicle joints 3 to 6 united.

Type.—Cat. No. 5728, U. S. N. M.

Hab.—Cape Colony, South Africa.

Host.—Rhynch.: *Dactylopius* sp. on Gorse. (Chas P. Loundsbury.)

Evidently the same thing, only slightly differently coloured, being more of a brownish yellow, having the sutures of the thoracic sclerites, a spot on the anterior part of the thorax and a band across the base of the abdomen, dark brown, but otherwise agreeing structurally; was bred by Prof. Loundsbury from a *Lichtensia* sp. on Pittosporum.

Family LXXI.—EULOPHIDÆ.

(3) *Tetrastichus prospaltæ*, new species.

♀.—Length, 0.7 mm. Black (possibly polished, the specimens being mounted on a slide in balsam, and the sculpture, if any, not being noticeable); face anteriorly and the legs, except the hind femora, apparently pale yellow; hind femora brown. Wings hyaline, the tegulæ and veins pale yellowish; the front wings, from base to the origin of the marginal vein, are wholly hairless, beyond they are closely, finely hairy and ciliate at margins; the marginal vein is very slightly longer than the subcostal, while the stigmal vein is much less than its length.

Type.—Cat. No. 5729, U. S. N. M.

Hab.—Outspoorn, South Africa.

Host.—Hym. : *Prospalta aurantii*, How., infesting a *Mytilaspis* sp. on Salix Capensis.

THE LIFE-HISTORY OF THE GREENHOUSE LEAF-TYER.

(Phlyctænia ferrugalis, Hbn., = Botis Harveyana, Grt.)

BY DR. JAMES FLETCHER AND ARTHUR GIBSON, OTTAWA.

The larvæ of *Phlyctænia ferrugalis*, Hbn., have been since 1897 the cause of some loss to roses in the large houses of Mr J. H. Dunlop, Toronto. References to this occurrence will be found in the Reports of the Entomologist and Botanist to the Dominion Experimental Farms for 1899 and 1900.

On the 12th November, 1900, a visit was paid to the above houses by Mr. Gibson, and specimens of the mature larvæ found feeding both on violets and chrysanthemums were secured, as also some larvæ in other stages of development. These all changed to pupæ, and in due course the moths appeared, the pupal state lasting from 17 to 20 days.

On the 4th December six moths, which had just emerged (the whole six within three days), were placed in a muslin bag over a violet plant. On the 7th December a large number of fresh eggs were noticed. They were laid on the under side of the leaves, sometimes singly, in pairs, in rows of 3 or 4, or in clusters of from 3 to 7, placed close together and overlapping at the edges.

The following notes, describing the egg and larval stages, were made:

Egg.—0.5 mm. in width, round in outline, much flattened, slightly raised in centre, pearly white, coarsely reticulated, and, from their flattened appearance, remarkably like those of the Codling Moth. Before hatching, the black heads of the young larvæ are very apparent through the shell.

The eggs which were laid on the 7th December hatched in a warm office on the 21st December, making the duration of the egg state 14 days.

Stage I.—Length, 2 mm. General appearance, semi-translucent creamy-white larvæ, body bearing long whitish hairs. Head 0.2 mm. wide, rather flattened, horizontal, inclined to be wedge-shaped, large, deep black, shining, and bearing slender whitish hairs. Mouth-parts pale brownish. Tubercles on segments piliferous and faintly darker than body,

the hairs whitish and slender. Skin of body smooth and shining. Thoracic feet and prolegs concolorous with body, all bearing short whitish hairs. After feeding, the colour of the green food contents gives the young larvæ a light greenish appearance.

The young larvæ feed on the under side of the leaves, and eat little holes into the soft tissue. When at rest they curl the head and front segments around to the side of the body, and if disturbed, fall and hang suspended on silken threads. When settled on a leaf, the young larva spins a few threads of delicate silk, from one portion of the leaf to another, feeding and living inside this slight, almost transparent enclosure.

On the 28th December one larva passed the first moult. Before moulting (a day or so), its colour changed, becoming very pallid. On the 29th December two more larvæ passed the first moult, and by the morning of the 31st December, eleven specimens had moulted.

Stage II.—Length, 2.5 mm. General appearance, shiny, semi-translucent, creamy larvæ, with a greenish tint, some specimens whitish; after feeding, dorsal surface distinctly green; body bearing long whitish hairs. Head 0.27 mm. wide, indented at vertex, rather flattened and horizontal, and shaped as before, shining, blackish-brown, in some specimens light brownish mottled with darker spots, margins of clypeus distinctly darkened, ocelli black, mouth-parts brownish, the face bearing slender light hairs. Body cylindrical, tapering slightly towards extremities, segments deeply divided, skin smooth and shining. Green dorsal vessel distinct, on either side of which are two very faint bands. Tubercles piliferous, larger and more noticeable than in last stage, the hairs long and slender. On segment 2 are two distinct black spots, one on each side, at margin of dorsal area. The thoracic feet and prolegs are concolorous with ventral surface of body, and bear slender pale hairs.

On the 7th January two larvæ were swollen and the next day they passed the second moult. Other specimens moulted on the 9th and 10th January.

In this moult, as in the previous one, the cast skin and head remain united, and look as if the larva had simply shrunk and dried up.

Stage III.—Length, 3.5 mm. General appearance, shiny, semi-translucent, pale green larvæ, with a green dorsal vessel and faint stripes down the back, the body bearing slender whitish hairs. Head 0.4 mm. wide, shaped as before, deeply indented at vertex, slight furrow between cheeks, pale brownish-yellow, rather translucent, mottled with brown

blotches, some specimens almost wholly light brown with darker blotches; margins of clypeus darkened in some specimens, ocelli black, mouth-parts brownish, in some examples light reddish, antennæ pale, darkened at tips, hairs on face white, long and slender. Body shaped as before: after feeding, dark green dorsally, pale ventrally. Piliferous warts large, but rather indistinct, hairs white, long and slender, skin smooth and shining. Dorsal vessel dark green, distinct, bordered on each side with two white bands. On segment 2 are the two distinct black spots as before. Spiracles are very small and faint, and are joined by an almost imperceptible white, hair-like line. Thoracic feet and prolegs concolorous with ventral surface of body, all bearing slender pale hairs.

On the 14th January three specimens were slightly swollen, and by the morning of the 15th had passed the third moult.

Stage IV.—Length, 6 mm. The general appearance of the larvæ in this stage is the same as in stage III. Head 0.67 mm. wide, small, not quite as large as segment 2, shaped as before, deeply indented at vertex, slight furrow between cheeks, honey colour, with pale brownish blotches, margins of clypeus not so distinctly darkened as before, but slightly furrowed at sides, mouth-parts pale reddish, antennæ honey colour, darkened towards tips, ocelli black. On lower side of cheek, close to posterior margin, in line with ocelli, there is a distinct black spot. The whole face bears slender pale hairs. Body tapers slightly towards extremities, as before; piliferous warts concolorous with body, each bearing a single long, slender, whitish hair. Dorsal area dark green, sides and venter pale green. On segment 2 the two black spots are the same as before, but now appear as if in a small rounded cavity. Behind each of these large spots, almost touching them, is a very small black dot. Segments deeply divided. The dorsal vessel and the double sub-dorsal band are very distinct in this stage. In some specimens the green space between the two bands bordering each side of dorsal vessel is suffused slightly with white. Spiracles whitish, joined by a distinct, slightly wavy, white line. Thoracic feet and prolegs concolorous with venter, all bearing a few slender hairs. The thoracic feet have each two blackish dashes exteriorly. The anal prolegs are extended, giving a bifurcate appearance to the anal segment.

During stage IV. the larvæ increased rapidly in size, and consumed much food, and also spun considerable quantities of silk.

On the 19th January one larva passed the fourth moult, and others on the 21st and 22nd January.

Stage V.—The general appearance of the larvæ in this stage is the same as in the last two stages. Length at rest, 11 mm. Head 1.0 to 1.1 mm. wide, large, about the same width as segment 2, shaped as before, deeply indented at vertex, and slightly furrowed between cheeks, pale honey colour, splashed with light brownish angulated blotches, which are larger than in stage IV., and mostly on cheeks. Mouth-parts pale reddish brown, antennæ pale, darkened at tips, ocelli black. The distinct black spot on the lower side of cheek, near posterior margin, is not now present, but close to where it was is a large elongated brownish blotch. Hairs on face and around mouth-parts pale and slender. Shape and colour of body as before; segments not so deeply divided as in last stage. The two large black spots on segment 2 are as before, as are also the two small black spots, observed in last stage, close behind these. In some specimens these latter spots are hardly visible, and in a few larvæ the large spots appear as if simply expanded slightly posteriorly. The piliferous warts resemble small swellings, and, being concolorous with body, are indistinct, unless examined with a lens. The large lateral warts on segment 2, just above the thoracic feet, bear a few brownish blotches. The dorsal vessel, the double sub-dorsal band, and the slightly wavy line joining the spiracles, are as before, but are faint on segments 2, 3, 12 and 13. The spiracles are small and whitish, slightly darkened at edge. The thoracic feet are concolorous with ventral surface of body, and bear two blackish-brown dashes exteriorly, prolegs pale; all the feet bear slender hairs. Anal prolegs divergent. Position of tubercles normal, except that ii is almost exactly in a line posterior to i.

When mature, the larvæ at rest measure 15 mm. long, and when extended, 18 mm.

On the 29th January one larva folded a leaf over, preparatory to changing to pupa. On the 30th January the folded portion was sealed, and by the 1st February the larva had changed to pupa. Another which began to spin its cocoon on the 30th January had changed to pupa by the 2nd February. In the remaining specimens the period covering the change of the larvæ to pupæ agreed with the above two.

When forming its cocoon, the larva simply folds over a portion of a leaf, and fastens it with threads of fine white silk, or choosing a central portion of a leaf, draws down another leaf to serve as a covering, and

then changes to pupa. The cocoon itself is very slight, and is merely a web or covering of slender threads of white silk.

Pupa.—Length, 8.75 mm.; width at widest part, 2 mm. The wing-cases and thorax are shiny black, lightly chased with vermiform lines. The abdomen is dull black, and finely shagreened, the segments transversely wrinkled on dorsum; the folds between the segments are ochraceous. On the thorax are 10 rather long, stiff, blunt, rust-red bristles, curving forward, 5 on each side, and along the dorsum are 2 series of conspicuous black warts, 1 on each side, each bearing a single, long, rusty, twisted hair, which first slopes forward and then swings towards the centre of dorsum, and backwards for ¾ of its length. The spiracles are black, and just above them is a row of small, black, piliferous warts, each with a single, thin, short hair. The cremaster is prominent, of a dull red colour, edged with black, and terminates in a bunch of 8 rust-red bristles, 4 on each side, which converge and cross at their tips, forming an arch. In one specimen the two posterior segments were the same colour as the cremaster.

The length of the pupal state of these specimens was the same as that of those moths bred from mature larvæ in, and previous to, November, 1900, viz., 17 to 20 days.

TWO NEW SPECIES OF PULVINARIA.

BY GEORGE B. KING, LAWRENCE, MASS.

Pulvinaria Hunteri, n. sp.—Old, dried and wrinkled female scales, cream-colour, more or less mottled with patches of red-brown, and the outer margin practically red-brown. Ovisac clear white, texture as in *innumerabilis*, and not so large. The size of the scale, cleared and spread under cover class, practically hemispherical, is from 6 to 7 mm. in diameter. The texture of the scale is quite thin and requires little boiling in caustic potash to make it very clear and colourless. The following measurements of antennal segments are in micromillimetres:

1	2	3	4	5	6	7	8	
40	48	64	48	20	24	20	36	On maple.
40	40	60	52	20	20	20	36	
40	40	60	48	28	20	20	44	On honey locust.
40	40	68	52	28	24	24	44	

Joint 3 is longest, 4 next; there is little difference in the length of 1, 2 and 8, and 5, 6 and 7 are nearly equal in length. The first joint has 3

hairs, two short and spine-like and one very long; the second has 3, two short and one long; the third has 1 long hair; the fifth, 3; the seventh, 2; and the eighth, 10; all of medium length. Legs ordinary, with the coxa, 140; width coxa, 88. Femur with trochanter, 192; width trochanter, 60. Tibia, 160; width, 28. Tarsus, 80; width, 24. Claw, 28. Spines of the lateral clefts in threes, one very long, not stout, 88 long; two short and small, 28 long. The large marginal spines are practically the same as those of *innumerabilis*, 36 and 40 long, but in the short, spine-like hairs of the margin they differ in being placed behind the large spines, whereas in *innumerabilis* they are in front.

Hab.—On maple at Kansas City, Kansas, (C. H. Swobode,) Col. auct., at Lawrence; Kansas, on honey locust, Col. S. J. Hunter, after whom I have the pleasure of naming this species, for the good work he has done in the publication of his studies in the *Coccidæ* of Kansas.

Pulvinaria Hunteri is evidently a native species and very distinct from any hitherto found in America.

Pulvinaria Ehrhorni, n. sp.— ♀ scales dark brown. Ovisac clear white, texture as in *innumerabilis*, and smaller. The shape of the scales under cover glass is practically round, although some of the smaller individuals are somewhat pyriform in shape, 4 and 5½ mm. in diameter. After prolonged boiling in caustic potash, the derm is strongly stained with brown; texture tough and thick. Gland pits numerous, of two sizes. Margin spines thin, sharp and inclined to be curved at their end, those of the area at the posterior cleft longest, 44 long, while those anteriorly are only 24 long. Spines of the lateral incisions in threes, one long and stout, 68 in length; two short and stout, 36 long. Anal plates, heart-shaped; each plate with three small spines at tip, and three larger bristles on the outer margin. Front leg: Coxa, 120; femur, with trochanter, 220; tibia, 128; tarsus, 88; claw, 28 long. Width: Coxa, 120; trochanter, 64; tibia, 32; tarsus, 24; with one long stout bristle on the coxa, and one on the femur, with two shorter ones on the trochanter. Antennæ, 8-jointed: 3 longest, 4 and 5 next, and in some individuals nearly equal; 1 is next, then 8, 6 and 7 are shortest and nearly equal. The first joint has one long and one short hair; the second, two long; the third, one; the fifth, two; the sixth, one; the seventh, two; and the eighth, nine;

these all stout, with one very long. The measurements of the several joints are as follows:

Joint—1	2	3	4	5	6	7	8
52	48	92	60	60–48	28	28	40
52	40	80	56	52	24	24	40
48	40	80	52	60	36	32	44

The approximate formula will be 345128(67). There are a number of long, thin hairs between the antennæ, very variable in length, 136, 80, 56 and 40. There are also some short, spine-like hairs.

Hab.—At Mountain View, California, on alder and willow; found May 3rd, 1899, by Mr. Edw. H. Ehrhorn. It is a very distinct species and can be separated easily from its nearest American ally, *Pulvinaria occidentalis*, by the antennæ. I take pleasure in naming this insect after Mr. Ehrhorn, in recognition of the fact of his good work done in the discovery and technical study of the Coccids of California. So far as known at the present time, this makes the fifteenth species native to the United States; and *P. Hunteri* is the fourth species found to infest maple.

I take this opportunity to record the finding of *Dactylopius Kingii*, var. *Neo-Mexicana*, Tinsley, in nests of *Lasius Americanus*, Em., at East Las Vegas, New Mexico, by Prof. Cockerell, and also *Ripersia flaveola*, Ckll., at Gullinas Canon, New Mexico, by Prof. Cockerell and Mrs. Wilmatte Cockerell, under a log in the transition zone, altitude about 7,500 feet. The same species was found by Mrs. E. L. Hewett and Mr. Cockerell at East Las Vegas, N. M., in the nest of *Lasius*, sp. Hitherto this species was only known from Massachusetts, from ants' nests.—G. B. K.

TYPES AND SYNONYMY.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, N. J.

Two papers in the last (April) number of the CANADIAN ENTOMOLOGIST are of great interest to me, and both on the same general topic applied to very different species. Mr. Lyman makes an earnest effort to save Mr. Walker's name *Spilosoma congrua*, and gives all the facts relating to the name, its publication and subsequent history; upon which facts Mr. Lyman and Sir George Hampson reach opposite conclusions. I have no liking for Mr. Walker's species, but I think I would side with Mr.

Lyman in this case, because, with all the examples before them, Messrs. Grote and Robinson separated out a good species with which a specimen of another, previously known, was erroneously associated. By removing one example, a good species remained, to which the name given by the author could be correctly applied.

All of us are apt to err in associating examples, and I have always made it a rule to hold a name if I can do it. So I think Mr. Lyman correct in this case on his statement of facts, though I had reached a different conclusion from a somewhat different combination of real and supposed facts.

On page 122, Dr. Harrison G. Dyar, Washington, D. C., assistant in charge of the Lepidoptera in the U. S. National Museum, has some remarks on certain species of *Acronycta* which are suggestive indeed.

First, he accepts my identification of *impleta* with *luteicoma* in so grudging a spirit that he suggests destroying the type—of *impleta*, I presume—"lest future changes in the synonymy result." It is to be assumed that Dr. Dyar wishes to be taken seriously, and in view of the fact that there are several hundred types in his charge, the suggestion is unpleasant reading. It is a somewhat startling method of securing stability of nomenclature!

Without disputing the facts as I stated them, that the type of *brumosa*, Gn., directly compared with that of *persuasa*, Harv., proves them to be identical, he yet proposes to retain *persuasa*, Harv., but to apply the name *brumosa* to what we have heretofore considered *hamamelis*. In other words, he desires to apply the name to a totally different species from that which was in the hands of its describer. That Guenée mixed up matters in attempting to associate Abbott's drawings of larvæ with the imagoes, is undoubtedly true, but it was the moth that was described and named, not the larva.

I am perfectly aware that a species is entirely represented only by all its stages and both sexes of the adults; but it is nevertheless true that it is the adult form that receives the name, and when we have the adult to which the name is applied, we have assumed that we had the court of ultimate resort by which the validity of the species must be tested. If we could set that adult aside because the description does not quite fit it, or because of an error in associating an earlier stage with the type, we might just as well abandon the effort to fix a type. And why should the U. S. National Museum desire types under such circumstances? If

its official representative refuses to recognize the application of type labels to the specimens with which they are associated in the British Museum, why should anyone else give greater credit to similar labels in the U. S. National Museum?

Dr. Dyar is not even consistent: it rather suits him to restore the term *clarescens* to the form which Mr. Grote originally and correctly so identified, though the description applies so much better to *haesitata* that I felt myself entirely safe in following Mr. Butler's reference of the name to the latter species. But because *hamamelis*, as applied to the form afterwards named *afflicta* by Mr. Grote, does not agree with his preferences, he suggests its application to what Mr. Grote named *subochrea*, because the description better suits that form.

The question narrows itself to this: Which is the court of final resort, the type specimen which the author named and intended to describe, or the description which, if it does not apply to the specimen it was made for, may apply to nothing at all?

In reference to the *var.* b of *brumosa*, Dr. Dyar is correct in saying it is not described; but Guenée evidently received additional information and perhaps specimens after writing the original description, for he refers again to the species on p. 390 of the 3rd volume of the *Noctuelites*, without adding to or changing the characterization of the adult.

Mr. Walker is not particularly good authority, but it is an indication at least that he suggested *brumosa* and *hamamelis* as sexes of one species; and Mr. Walker was not famous as a lumper either. Assuming my suggestions as to synonymy to be correct, Walker's remark is not so far out, especially when that *var.* "b" is considered; but assuming Dr. Dyar to be correct, the suggestion becomes ridiculous, because Walker, ever on the lookout for differences, simply could not have considered *hamamelis*, Auct. (not Gn.), as the same as *subochrea*. The bare fact is that the specimen which in the British Museum is marked as the type of *hamamelis*, Gn., is that form which Mr. Grote afterward called *afflicta*, and that the form to which Dr. Dyar now wishes to apply the name *brumosa* was apparently not in Guenée's hands at all!

The twentieth annual meeting of the Royal Society of Canada will be held at Ottawa, beginning on Tuesday, May 21st, under the Presidency of Mr. Louis Frechette, C. M. G., LL. D.

THE AMERICAN BEES OF THE GENUS ANDRENA DESCRIBED BY F. SMITH.

BY REV. F. D. MORICE AND T. D. A. COCKERELL.

(Continued from page 124.)

Andrena fragilis, Smith, 1853.

"This I suspect is the ♂ of *integra*; area similarly strigose, and abdomen also corresponds; tubercle matches also!"

Robertson thought this might be *A. platyparia*: but, he said, the description applied even better to *salicis*, and nearly as well to *mandibularis*. It cannot well be *salicis*, as that has the abdomen impunctate; if it is the ♂ of *integra*, it cannot well be *mandibularis*; it may perhaps be *platyparia*.

Andrena frigida, Smith, 1853.

"(Very near *apicata*, but hairs of thorax much darker) ? = *lapponica;* antennæ with very long third joint; tubercle ∩; area granulated; abdomen in style of *apicata*."

Type locality, Nova Scotia. I do not know any similar species.

Andrena fimbriata, Smith, 1853 (*Americana*, D. T.).

" ♂ abdomen rugulose and punctured, clothed with long adpressed hairs; tubercle slightly emarginate (?); area dull granulose; ♀ ditto. (Very near *fuscipes*, perhaps identical with it.)" This agrees with what I had already identified from Smith's description. It seems to agree with the description of *A. simillima*, Sm., even better than with that of *fuscipes*, but I doubt its actual identity with either.

Andrena hirticeps, Smith, 1853.

♂. "Tubercle pointed apparently, hard to see under thick bush of hair on clypeus; area obliquely rugose at base only, no raised margin; abdomen tessellate, practically impunctate; apical ventral valve somewhat bilobed; antennæ with article 3 = 4 + 5 about, all joints pretty long. Has a good deal the aspect of *gwynana*." This was considered the ♂ of *A. vicina*, but Robertson (1900) has come to regard it as a valid species. He further adds: "But for the description of the ♂, I would say that *A. errans* is the same as *A. hirticeps*." I have an Illinois "*hirticeps*," ♂, from Mr. Robertson, and the abdomen is distinctly punctate at the bases of the hairs, while the third antennal joint is barely longer than the fifth, the fourth being a little shorter than either. The apical ventral

valve also is not bilobed. In the female of Robertson's "*hirticeps*," the basal process of labrum is low, broad and rounded (semi-circular, Robertson expresses it), which does not agree with *vicina* or *errans*. Robertson's insect will therefore need a new name, as follows:

Andrena Carlini, n. n., Ckll.

Andrena bicolor (not of Fab.), Rob., Tr. Am. Ent. Soc., XVIII., 51.

Andrena vicina (not of Sm.), Rob., Tr. Am. Ent. Soc., XXII., 118.

Andrena hirticeps (not of Sm.), Rob., Trans. Acad. Sci., St. Louis, X., 47.

The true *A. hirticeps* is a northern species, from Hudson's Bay. *A. Carlini* is from Illinois; type locality, Carlinville. It also occurs in Kansas, N. Y. and N. M. (see below).

Andrena algida, Smith, 1853.

♂. "Tubercle truncate; apical ventral valve ∩; antennal joint 3 about = 5, slightly longer than 4; area (longitudinally) somewhat rugose; abdomen tessellate and also delicately punctured." Type locality, Hudson's Bay. The ♂ is rather suggestive of *Carlini*, except as to the tubercle.

The ♀ described by Smith is not at all like *Carlini*.

Andrena nubecula, Smith, 1853.

♀. "Tubercle emarginate; area shortly rugose at base; abdomen tessellated, impunctate; a pretty insect, with broad white bands and pale reddish-yellow apex; antennal article 3 scarcely = 4 + 5 (cf. *proxima* or *dorsata*)." "Wings remarkably clouded."

I have this from Lincoln, Nebraska, collected in August and September, sent by Prof. L. Bruner (No. 12). Smith's description of the abdomen is inaccurate as regards the punctuation.

Andrena obscuripennis, Smith, 1853.

♀. "Tubercle convexly truncate; abdomen closely punctured; area bordered with raised ridge, rugose but not very largely so, and laterally only granulated; wings beautiful violet; pilosity rich red (large grand species)." Type locality, Georgia. This has some resemblance to *A. Hallii*, but is quite distinct.

Andrena perplexa, Smith, 1853.

♀. "Tubercle truncate; area seems nearly smooth, but dull, with fine close tessellations; abdominal segments smooth and closely punctured, except towards their apices, which are rugulose." Type

locality, Georgia. This is evidently different from any species I have seen.

Andrena nivalis, Smith, 1853.

♀. "Tubercle /‾\ ; antennal joint 3 longer than 4 + 5 ; area rugose at base; abdomen distinctly punctured, but on an aciculated surface." Type locality, Hudson's Bay. This is very near to *A. semirufa*, Ckll., from New Mexico ; possibly it is the same species.

Andrena hilaris, Smith, 1853.

♀. "Tubercle of labrum wide, truncate, below its centre a projecting pencil of golden hairs ; clypeus coarsely punctured, with a smooth shining carina down its middle ; metathoracic area finely rugulose, with some coarse short longitudinal strigæ at its base ; abdomen distinctly punctured, its surface also microscopically (hardly visibly) rugulose ; wings very yellow." Type locality, Georgia. Evidently distinct from anything I have before me.

Andrena vicina, Smith, 1853.

♀. Length "about 14 mill.; tubercle wide, truncate ; clypeus with wide unpunctured central elevation; area dull rugulose; abdomen finely rugulose all over, and distinctly but shallowly punctured." Smith gives the length as only 5 lines, and says the species closely resembles *A. nitida*. I hardly know what to make of this ; the species referred to *vicina* in American collections has the tubercle low and rounded, by no means truncate ; also, it does not have the very shiny, oval abdomen of *nitida*, which species, it may be remarked, has the tubercle concavely truncate. *A. vicina* is said to be from the United States and Nova Scotia.

Andrena placida, Smith, 1853.

♀. "Tubercle very narrowly truncated ; area rather coarsely rugulose, but not margined, I think ; abdomen rugulose, a few sparse punctures ; length about 12 mill., much smaller and narrower insect than *vicina*—looks like a *parviceps*." From "U. S." Smith gives the size the same as that of *vicina*, but this must be a mistake. *A. placida* seems to come close to *A. Macgillivrayi*.

Andrena fastuosa, Smith, 1879.

♀. "Tubercle /‿\ , difficult to say if actually emarginate ; area and abdomen as ♂."

♂. "Tubercle emarginate ; huge stipites ! area rugose, unmargined ; abdomen closely punctured." From Orizaba, Mexico. *Andrena*

argemonis, Ckll., from New Mexico, is possibly not separable from *fastuosa*.

Andrena discreta, Smith, 1879.

♀. "Coloured like a big bright *cetii*; tubercle emarginate; area finely rugose, unmargined; abdominal segments densely clothed above with fulvous hairs, except the basal which is naked." Oajaca, Mexico. When describing *A. jessicæ* I suggested that it might possibly be the ♂ of *discreta*, but it is now evident that this cannot be.

Andrena sodalis, Smith, 1879.

"Tubercle ⌒; abdomen shining, though rugulose, and also very delicately punctured; area not margined nor rugose." Oajaca, Mexico.

Andrena simulata, Smith, 1879.

"Labrum almost pointed ∩, I see no definite tubercle; abdomen smooth, very shining, shallowly punctured; area without ridge, rugosities slight, longitudinal at base." Orizaba, Mexico.

Andrena agilis, Smith, 1879.

♂. "Labrum looks truncate, I can't see tubercle; clypeus not all white, but marked with yellow like a ♀ *Ceratina;* abdomen finely punctured; area rugulose, not clearly defined at sides; central impression deep?" Oajaca, Mexico.

Andrena modesta, Smith, 1879.

♀. "Sides of propodeum fringed with short white hairs; area rugulose, not margined; abdomen finely punctured; no tubercle to be seen." Oajaca, Mexico.

Andrena commoda, Smith, 1879.

♀. "Tubercle pointed ∧; area not margined, fine basal strigæ; abdomen punctured, also aciculate, dull." This nearly agrees with *A. pruni*, Rob., but the tubercle of that species is not at all pointed. *A. commoda* is from Canada.

Andrena flavoclypeata, Smith, 1879.

♂. "Clypeus has a *third* black spot in middle of apex; tubercle hard to see through hairs, I think a little emarginate; area not ridged; abdomen tessellated, scarcely punctured." Locality, Canada. This is regarded as a synonym of *A. bipunctata*, Cresson, and is well known. The third black spot is not always present.

Andrena miranda, Smith, 1879.

♂ ♀. "Clypeus /‾‾\ ; area coarsely clathrate and margined ; abdomen strongly punctured." Canada. Related to *A. Forbesii*, but not the same.

Andrena mœsta, Smith, 1879.

"Area scarcely rugulose, not margined; abdomen scarcely punctured *(lapponica* style); tubercle slightly emarginate or bilobed. Canada. This species appears to differ from any known to me.

Andrena errans, Smith, 1879.

"Area not margined, smooth nearly ; abdomen with shallow punctures ; tubercle pointed (one ♀ has the discs of abdominal segments densely clothed with black upright hairs, probably a different species)." Vancouver I. This is not the north-western species which I have regarded as *errans;* the female with hairy abdomen may be *pluvialis.*

A close study shows that there are several species confused with *vicina* or *errans* in American collections. These (♀) all agree in being about 13 or 14 mm. long ; the thorax densely clothed with upright rather short hair (bright ferruginous in *Hallii*, pale ochraceous in the rest) ; the abdomen shining black, without hair-bands ; the anal fimbria black ; the wings decidedly brownish. The species of this series now before me are :

A. Carlini, Ckll.: Tubercle of labrum broad and evenly rounded ; clypeus with a median impunctate ridge ; hair of face mixed pale and black, of pleura black ; basal area of metathorax roughened, not plicate ; abdomen tessellate and well punctured ; antennal joint 3 rather shorter than in *Hallii.* Illinois ; Beulah, N. M., May 30 *(W. Porter);* Baldwin, Kansas, May *(J. C. Bridwell);* Ithaca, N. Y., May 17 *(Macgillivray).* Seven specimens examined.

A. Hallii, Dunning: Tubercle of labrum broad but truncate ; median line of clypeus impunctate, but minutely tessellate; hair of face and pleura black ; basal area of metathorax obliquely plicatulate at base ; abdomen tessellate, with numerous small punctures. Pullman, Wash. *(C. V. Piper).*

A. cupreotincta, Ckll., n. sp.: Tubercle with sloping sides and truncate apex ; clypeus without a median impunctate ridge, or it is very short and rudimentary ; hair of face, cheeks, occiput and

pleura black; basal area of metathorax strongly longitudinally plicate, its sculpture entirely different from that of the adjacent lateral areas, though it has no raised margin; abdomen well punctured on a smooth surface, the punctures very strong and close at the sides of the segments; hair on inner sides of basal joints of tarsi tinged with coppery. Skokomish River, Wash., April 26, 1892 *(Trevor Kincaid)*.

A. pluvialis, Ckll., n. sp.: Tubercle with sloping sides and truncate apex; clypeus without any impunctate line; hair of face black, a little pale at sides, of vertex and cheeks black, of occiput pale, of pleura black; area roughened,not plicate,longer than in *cupreotincta*, and so larger, larger than in *Carlini* because broader behind, its posterior angle greater; abdomen with a sericeous lustre, the punctures small; surface of abdomen quite hairy, the hairs black. Olympia, Wash., May 1, 1894 *(Trevor Kincaid)*.

A. anogræ, Ckll., n. sp.: Agrees with *pluvialis*, except that pubescence of thoracic dorsum is brighter, more fulvous; hair of face is wholly black; tubercle is small and emarginate or binodulose at apex; area is more coarsely rugulose and much narrower behind, being shaped as in *Carlini*. Colorado Springs, Colo., middle of July, at flowers of a white *Œnothera* (Ckll., 3567).

A. vicina, Smith: Tubercle broad and truncate, the truncation sometimes concave and distinct, sometimes rather obscure; clypeus with a median impunctate ridge, which is more or less roughened; hair of face pale, black only round the mouth, or only below the mouth; hair of cheeks, vertex, occiput and pleura pale, area roughened, large, not narrower behind, shaped as in *pluvialis*, but the sides of the metathorax are clothed with pale hair, whereas in *pluvialis* it is black; abdomen tessellate and well punctured, hardly hairy except apically, being much less hairy than in *pluvialis*; hair on first segment pale. Olympia, Wash., June 4, 1895 *(Trevor Kincaid)*; Michigan *(C. F. Baker*, labeled *A. bicolor)*; Hartford, Ct., May 30, 1894, and May 31st, 1896 *(S. N. Dunning)*. This is evidently the true *vicina* of Smith; it ranges further north than *Carlini*.

Andrena cærulea, Smith, 1879.

"Area smooth, not margined; abdomen rugulose with slight raised points; tubercle I think slightly emarginate." Vancouver I. *A.*

cærulea, var. *territa*, Ckll., Entom., 1898, p. 89, is perhaps a distinct species; in the description, line 15 from top of page, tinge is misprinted "fringe." *A. nigrocærulea*, from the same region, has the tubercle concavely truncate, one might say slightly emarginate, but it is otherwise different from *cærulea*.

Andrena subtilis, Smith, 1879.

"Tubercle $\wedge$; abdomen tessellated, hardly punctured; area smooth, not ridged laterally." Vancouver I. I do not know this species.

Andrena candida, Smith, 1879.

"Abdomen dull green, scarcely punctured; area with rugosities slight, no ridge; labrum ? a little emarginate." Vancouver I.; Olympia, Wash., June 18, 1895 *(Trevor Kincaid)*. In Mr. Kincaid's specimen the hair at apex of abdomen is blackish, but the species is doubtless the same. *A. geranii*, Rob., is closely allied.

Andrena auricoma, Smith, 1879.

"Can't see labrum; a pretty insect with fulvous upright pilosity on discs of segments and golden fasciæ at the apices; area granulose, not margined." Vancouver I. Unknown to me.

BOOK NOTICE.

REPORT OF INJURIOUS INSECTS and Common Farm Pests during the year 1900, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, LL.D. London: Simpkin, Marshall & Co., 1901 (1s. 6d.; pp. 111).

It is with deep regret that we learn from the preface of this her twenty-fourth annual report that the talented authoress has decided that it shall be the last. For almost a quarter of a century Miss Ormerod has labored hard and well in the service of her country, without any remuneration and with scanty recognition from the officials who should have been the first to express their gratitude to her. But, on the other hand, she has won for herself a high reputation in Great Britain, in America, in South Africa and Australia, and also in several European countries. She is known far and wide as a painstaking entomologist, a keen observer, a diligent collector of facts and observations, a thoroughly practical and sensible adviser, and one who has been all through these years most unselfish in placing her time and her work at the disposal of those who needed them most—the farmers and gardeners of her native land.

When she began her life-work in 1877, to quote her own words, "comparatively little was known of the habits and means of prevention of insects seriously injurious to our crops, and of this little, a very small amount was accessible for public service, and I undertook the series of Reports in the hope (so far as in my power lay) of doing something to meet both these difficulties." How fully her hope has been realized is shown by her further statement: "Now, the *necessities* of the case have been gradually changing. Year after year information has been sent, gradually completing *most* of the histories of *most* of our worst insect pests, and now additional information is rarely on points of great agricultural importance." In other words, she has succeeded, by dint of long-continued and hard work, in making fully known the life-histories of all the most serious insect pests in the British Isles, and in prescribing the best available methods of dealing with them. No such work can ever be finished or ever be perfect, but Miss Ormerod has done the task of the pioneer; she has cleared away the obstructions of ignorance and has laid solidly and well the foundations of a knowledge that requires now only to be kept up and added to as time goes on and changes naturally occur. Working without remuneration and publishing at her own expense, she has done a noble and patriotic work, and her name will long live, we may be sure, in the hearts of those she helped so well, and in the affections of those who have the privilege of being her friends.

The present Report, the second of the new series, is on the same plan as its predecessor. It deals at some length with twenty species of injurious insects affecting the apple, pear and plum, currant and raspberry, potatoes, beans, wheat and mustard, ash trees and sheep's nostrils—a varied list, indeed. There is also an account of the curious flatworm *(Bipalium Kewense)* which feeds upon earthworms, and of the fungous disease which produces what are known as "bladder plums." The volume closes with short notices of some insects that have often been referred to before in these Reports—the apple Psylla, gooseberry Sawfly, cabbage Moth attacking peas, and the pine-shoot Tortrix. The various papers are illustrated with about thirty excellent wood-cuts.

We grieve to say "good bye" in this way to our venerated friend, whom we have known and esteemed for so many years. We earnestly hope that her days on earth may be prolonged, that she may enjoy a rest that she has assuredly earned, and that she may still continue her interest in Economic Entomology and give the help of her knowledge and experience when from time to time it may be sorely needed.

C. J. S. B.

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The Canadian Entomologist

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No. 6.

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WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

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The Canadian Entomologist.

VOL. XXXIII. LONDON, JUNE, 1901. No. 6

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.-W. T.

BY F. H. WOLLEY DOD, CALGARY.

(Continued from page 42.)

1. *Danais archippus*, Fab. A few migrants seen almost every year. June. Have never seen a locally-bred specimen.

2. *Euptoieta claudia*, Cram. Two specimens on Pine Creek, July, 1897, and June, 1900; probably migrants. Lacombe, June 29th, 1900 (Gregson).

3. *Argynnis cybele*, Fab. Not common; very rare in some seasons. In the hills, July and August; Lacombe, June 29th (Gregson). Mr. Elwes has seen this form and considers it correctly named. It resembles *cybele* that I have from Iowa, but is slightly smaller.

3a. [*A. leto*, Behr. Recorded by Geddes from Macleod. The record may perhaps refer to *cybele*.]

4. *A. cypris*, Edw. Not common. July and August. Whatever may be the correct name for this species, it is certainly distinct from anything else here listed. Dr. Fletcher calls it *cypris*, and Mr. Elwes says: "It does not agree exactly with any species, but is something between *lais*, *halcyone* and *atlantis*." *Lais* certainly resembles it more closely than anything else occurring near Calgary. I have a ♂, sent me by Dr. Fletcher, labeled *aphrodite* (but without data), which agrees well with my *cypris*, though the black markings in his specimen are slightly heavier. Neither bear any more resemblance to *aphrodite*, sent me from Binghampton, N. Y., than they do to *cybele*. Mr. Snyder treats *cypris* as the Western form of *aphrodite*, and it seems probable that the *aphrodite* recorded from Edmonton, in Northern Alberta, refers to the form I take here. Mr. Gregson tells me that he takes a form at Lacombe which Dr. Fletcher says is "near *cypris*, but

distinct." In his letter to Mr. Gregson, Dr. Fletcher adds: "If about forty of our American species are valid, this also, I think, is a valid species. I have specimens of it from the Rocky Mountains right across the plains to the borders of Ontario." I have reason to believe that he refers to the species which he named *cypris* for me a few years ago.

5. *A. lais*, Edw. Very common. June to August. Also at Banff in Aug. (Sanson). Lacombe "uplands, July, common" (Gregson).

6. *A. electa*, Edw. Not common. July and Aug.; also at Banff (Sanson). Lacombe "uplands, not common" (Gregson). One ♂ and one ♀ out of five ♂ ♂ and two ♀ ♀ in my series have been labeled *electa* by Mr. W. H. Edwards. Here I suffer sadly from lack of material, as, though the form is far less common than *lais*, I could long ago have obtained a good series, had it not been for pressure of other business during its season. I have *atlantis* ♂ from Prince Edward Island, which I cannot distinguish on the upper side from Calgary *electa*, though on under side of secondaries the spots are slightly larger, the buff submarginal band distinctly narrower, and ferruginous area more rusty reddish than in most of my short series. A ♂, sent me from Banff by Mr. Sanson, and named *electa* for him by Dr. Fletcher, is almost an exact counterpart of my P. E. I. *atlantis*, though smaller than it or any of my *electa*; whilst *atlantis* ♀, also named by Dr. Fletcher, from Mr. Gregson, of Lacombe, differs from a Calgary ♀, labeled *electa* by Mr. Edwards, only in being slightly larger. A worn ♂ which I took at Laggan last August seems to come nearer the P. E. I. specimen than does anything I have taken near Calgary. The species, whatever it is, is slightly darker than *lais*, the markings altogether heavier, and dusky brown basal area above darker and wider in extent. The veins above on primaries are also much more broadly clothed with black scales than in *lais*. On the under side the differences are less pronounced, though the ferruginous area on secondaries is usually, though not always, paler in *lais* than in the other form. The above remarks apply to the ♂ ♂. I have only seven ♀ ♀ belonging to either form, and must confess my difficulty in deciding where to place them. *Atlantis*, which is recorded by Geddes from the Rocky

Mountains of Alberta, may eventually prove to be the correct name for the species, or it is even barely possible that I may have eventually to bracket my *electa* with *lais*, but at present I certainly have no evidence to justify the placing of Alberta *atlantis-electa* material under two names.

7. *A. monticola*, Behr. Banff. August.

8. *A. halcyone*, Edw. Probably not rare in the foothills. I have examined altogether seventeen specimens, all ♂ ♂, taken by Mr. Hudson, who says it occurs both near Billings's lumber mill and Lineham's lower log camp. All these bear date of July 12th, though taken in different years. He also took a single ♂ near the head of Pine Creek, on July 7th, 1896, but the species has not been met with elsewhere east of the spruce. In this we have, judging from the verdicts of Drs. Skinner and Holland, a form referable to either *halcyone* or *coronis*. Allowing for the usual sexual differences, my form agrees fairly well with the figure of *halcyone* ♀ in Mr. Edwards's Butt. N. Am., except that none of my specimens have the rosy tinge on under side of primaries, and the silver spots in second row (of secondaries) are of less uniform shape than in the plate, and the ferruginous area in no case quite as dark. Many of my specimens have a decided tinge of green, noticeable only in certain lights. I have not seen his plate of the ♂. I sent a specimen to Dr. Skinner as *halcyone*, which he considered correct. I had sent the species to Dr. Holland, before seeing Edwards's figure of ♀ or receiving Dr. Skinner's opinion. I quote Dr. Holland's words: "It might as well be *coronis* as anything else. I have a specimen from Mt. Judith, Montana, in the Edwards collection, which agrees exactly with your specimen." The black markings above in the Pine Creek specimen are much heavier, and the basal area darker, than in any of those taken further west.

9. *A. Nevadensis*, Edw. Very common everywhere. July and August. It seems probable that past records of *Nevadensis*, *Edwardsii* and *Meadii*, from Alberta, all refer to one species. I have examined a large number of specimens of both sexes, taken from the mouth of Pine Creek to the foothills, and from Calgary to Sheep Creek, as well as some taken by Mr. Gregson at Lacombe,

and believe them to be all one species. As compared with the plate of *Nevadensis* ♀, in Vol. III. of Mr. Edwards's Butt. N. Am., all the ♀ ♀ I have seen are larger and darker above. The silver spots are generally more elongated, and the reddish area on primaries beneath generally brighter, especially near the base, but in some specimens almost lacking, or confined to the mere bordering of the veins. In a few ♂ ♂ this reddish tinge is absent. The shade and intensity of the green is extremely variable. One of my specimens is labeled "*Nevadensis* ♀" by Mr. Edwards himself. The specimen has lost its abdomen, but I believe it to be a ♂. I have compared specimens from Lacombe, called *Edwardsii* by Dr. Fletcher, with the south of Calgary form, and can see no difference. Dr. Skinner has seen the species, and says: "The specimens you send are certainly not *Edwardsii*, nor are they true *Nevadensis;* nor are they exactly like the Colorado *Meadii*, but they come nearest to *Meadii.*" It is worthy of note that the great majority of my specimens of this species are ♀ ♀. In every other species of *Argynnis* occurring here, the proportion of ♂ ♂ taken will exceed the ♀ ♀ by at least five to one.

10. *A. eurynome*, Edw. Very common everywhere. July and August. Var. *clio*, Edw. Not rare, and widely distributed south of Calgary. Banff (Sanson). Mr. Gregson says it is extremely local at Lacombe. I have a specimen, which Mr. Edwards called an "unsilvered" *Nevadensis*, which I believe to be ♀ *clio*, and Mr. Elwes supports me in this view.

11. *A. myrina*, Cram. Locally common. Calgary and Lacombe, July and August. Banff, June 17th (Sanson).

12. *A. triclaris*, Hüb. Not rare locally, on marshy ground near the spruce timber; July. Banff, June 3rd (Sanson); Laggan (Bean); Lacombe, very local (Gregson).

13. *A. chariclea*, Schneid. Very common in the mountains and as far as the eastern limit of the spruce. I believe the form is referable to *Boisduvalii.* Mr. Elwes has taken it himself at Laggan, and considers *Boisduvalii* and *chariclea* to be synonymous.

14. *A. freija*, Thunb. Common everywhere in the hills near Calgary, preferring hillsides amongst dwarf willow bushes; May (earliest

record April 30th); Banff (Sanson); Lacombe, common everywhere (Gregson).

15. *A. frigga*, Thunb., var. *saga*, Kaden. Common in much the same localities as *chariclea*, occurring at Laggan, and eastwards nearly to Calgary. Also at Lacombe (Gregson), June.

16. *A. bellona*, Fabr. Common everywhere, end of May and June. Partially double brooded near Calgary, the second brood appearing in fewer numbers towards the end of August.

17. *A. alberta*, Edw. Mr. Bean is familiar with the habitat of this species, on mountain tops near Laggan. July?

18. *A. astarte*, Doubl.-Hew. Mountain tops near Laggan (Bean). I saw several specimens there myself on August 8th of last year (1900), on, and a few hundred feet below, the summit of Slate Mt., about three miles south-east of Laggan station. Its habits are aptly described by Mr. Bean in Vol. III. of Edwards's Butt. N. Am. I certainly found its flight to be "exceptionally swift," and even when it did not disappear over the edges of cliffs, I found it impossible to keep it in view for more than a few seconds whilst on the wing. I succeeded in taking one ♂—the only specimen I saw settle—which was doubtless the easier to net owing to its badly-worn condition. I took a badly-worn ♂ on the top ridge of Sulphur Mt., Banff, on August 12th, at an altitude of about 7,200 ft., and saw several more. I have since seen a ♂, evidently in splendid condition when taken, captured by Mr. Sanson near the same spot on June 27th, 1900. This measured 40 mm. in expanse, which is smaller than the size mentioned in Mr. Edwards's work. I hear, on good authority, that the species was taken near the Devil's Lake, about ten miles north-east of Banff, in 1898.

19. *Melitæa anicia*, Doubl.-Hew. A single ♀, rather worn, was taken by Mr. Hudson in the foothills near Lineham's lower log camp, on the south fork of Sheep Creek, about forty miles south-west of Calgary, on July 12th, 1896, at about 5,000 feet. I took several specimens (var. *Beanii*, Skinner), in indifferent condition, on August 8th, 1900, at Laggan, but did not meet with it below the timber line (about 7,000 ft.). I took it a few days later on Sulphur Mt., Banff, but scarcely below 6,000 ft. One specimen

appeared to be quite fresh. Mr. Sanson's records for Banff are May 29th and June 18th.

20. *M. Whitneyii*, Behr.? A single ♂, in fine condition, taken by Mr. Hudson in the spruce near Billings's lumber mill, on July 5th, 1896, is probably either this species or *palla*, Bd., which is recorded from the Crow's Nest Pass by Geddes.

21. *Phyciodes ismeria*, Bd.-Lec. Common at Lacombe; June (Gregson).

22. *P. tharos*, Dru. Common everywhere. June to September.

23. *P. pratensis*, Behr. Common on the hill-prairie near Calgary, June to August; Banff (Sanson).

23a. [*Phyciodes sp.?* A single ♀ near Lineham's lower log camp, July 13th, 1896, which I have been unable to identify. It may be an aberrant *pratensis*.]

24. *Grapta satyrus*, Edw. Fairly common; Calgary and Banff.

25. *G. faunus*, Edw. Not common; Calgary and Banff.

26. *G. zephyrus*, Edw., vel. *progne*, Cram. Common, apparently everywhere.

} July to September.

Here I must confess myself somewhat at sea in the matter of species, though I have made a careful study of all the scanty material I could obtain, including specimens kindly lent me for the purpose by Mr. Gregson and Mr. Sanson. A specimen sent me from Banff as *satyrus*, on the authority of Dr. Fletcher, resembles a Calgary specimen labeled "Like *satyrus* in Elwes's collection"; and *zephyrus*, named for me by Dr. Holland, agrees with *zephyrus* named by Dr. Fletcher from Banff, and with a Calgary specimen labeled "Like *zephyrus* in Elwes's collection." *Progne* is the name given to a Calgary specimen of the same form by Mr. W. H. Edwards, and to a similar Lacombe specimen by Dr. Skinner. Mr. Bean used to take a species at Laggan which he called *zephyrus*, and I have placed the form under that name. *Satyrus* differs from this form in having larger black spots, darker basal area above, and usually, though not constantly, larger submarginal yellowish blotches. Beneath, both forms are very variable, both in colour and shape of band and strigations, and in the shape of the white discal spot. The colour in *zephyrus* is

usually varying shades of gray, and discal spot is a fairly well rounded G or C. In *satyrus*, the colour is chocolate brown, and the spot usually a distinctly angulated L, though sometimes rather rounded and more resembling C. I am not yet fully satisfied as to the distinctness of these forms; nor yet of *faunus*, which has been applied by Dr. Fletcher to a Banff specimen, well duplicated by one from near Calgary. Above it is nearest to *satyrus*, but smaller; beneath it is almost intermediate between that and *zephyrus*, but shows greater contrast in shading than either. The green submarginal spots (beneath) are present, as occasionally in *zephyrus*, though brighter than in that form, and the white mark is of much the same type.

27. *G. J-album*, Bd.-Lec. A single specimen on Pine Creek, Aug. 25th, 1898. One more seen. Banff, August 8th (Sanson). Lacombe, August, scarce (Gregson).

28. *Vanessa antiopa*, Lin. Common everywhere. July to May.

29. *V. Californica*, Bd. One worn specimen on Pine Creek, June 25th, 1900; probably a migrant.

30. *V. Milbertii*, Godt. Common everywhere, and on the wing from April to September. Fresh specimens to be seen from July onwards.

31. *Pyrameis atalanta*, Lin. Usually very rare. My only records are June 22nd and Aug. 4th. It was not uncommon in 1900—a great year for migrants. Lacombe, July 1st, 1900 (Gregson).

32. *P. cardui*, Lin. Common some seasons, notably in 1900. Worn specimens seen towards the end of May, but I doubt whether it hibernates here; full-grown larvæ on June 10th.

33. *Limenitis arthemis*, Dru. Common in the hills. I have taken it as far east as the mouth of Pine Creek. End of June to August. Lacombe (Gregson); Anthracite (Sanson).

34. *Cœnonympha inornata*, Edw. (=*ochracea*, Edw.?). Very common everywhere in the hills near Calgary and also on the level prairie. Lacombe, common (Gregson). June and July. A small portion of a second brood in September. I have both names from Mr. W. H. Edwards, but I have examined a large number of specimens and cannot recognize two species.

35. *Erebia discoidalis*, Kirby. Common, especially in the hills; also at Lacombe and Banff. May (earliest record, April 30th).

36. *E. disa*, var. *mancinus*, Doub.-Hew. Lacombe, in a tamarack swamp, fairly common. May (Gregson). Mr. Elwes is the authority for the name. Mr. Sanson records it from Banff. It probably occurs there, but the specimens he sent me under this name were the following species.

37. *E. epipsodea*, Butl. Very common everywhere. June and July.
Var. *Brucei*, Elwes? A single specimen of this var., or something very like it, taken at the head of Pine Creek, is in the collection of Mr. Elwes. I have never seen another.

38. *Satyrus alope*, form *nephele*, Kirby. Very common around Calgary and Lacombe. July. I have specimens labeled both *olympus* and *ariane* by Mr. Edwards.

39. *Chionobas Macounii*, Edw. Decidedly rare and very erratic in appearance. June and July. Has been taken near Calgary, Red Deer, and Morley. For further notes on this species vide CAN. ENT., XXX., p. 298, et seq. In addition to the records there given, a single specimen was seen in 1900 in the spruce near Billings's lumber mill.

40. *C. chryxus*, Doub.-Hew. Banff and Laggan. June to August. Have never seen it anywhere near Calgary.

41. *C. alberta*, Elwes. Usually very abundant on the prairie around Calgary. Far less common near the spruce limit. May and June (earliest record, May 3rd). Extremely variable in colour, mesial band on secondaries, and number of ocelli. I have specimens of both sexes without ocelli. No records from Banff or Lacombe. The validity of this species has long ago been fully established by both Mr. Elwes and Mr. W. H. Edwards. A treatise dealing fully with the form would occupy too much space here; but, for the benefit of those who still have difficulty in distinguishing it from *varuna*, it may be pointed out that the mesial band on primaries beneath, sharply toothed outwards below the cell—the tooth being invariably visible from above—as well as the usually conspicuous whiteness of the veins on secondaries, are comparatively safe guides by which *alberta* may be distinguished from the following species. The safest guide of

all is perhaps that "general appearance" which is so hard to define.

42. *C. varuna*, Edw. Very common around Calgary, especially on the level prairie, and occurring as far west as Kananaskis (Macoun); Lacombe (Gregson). June and July (earliest, May 14th). A larger and brighter-coloured species than the preceding, and perhaps even more variable; also differing somewhat in manner of flight, owing, probably, to greater strength of wing.

43. *C. jutta*, Hübn. Common in spruce woods near Calgary in June. Also at Laggan. It probably occurs at Banff, though I have no record from there.

44. *C. Beanii*, Elwes. Mountain tops, near Laggan (Bean). I took a fresh, but crippled, ♂ there myself on Aug. 8th, 1900.

45. *Thecla humuli*, Harris. A single specimen brought to me in 1894, taken on the level prairie about twelve miles south of Calgary, near the mouth of Fish Creek. I see no reason why it should not be locally common.

46. *T. augustus*, Kirby. Common. May and early June. Also at Banff (Sanson).

47. *T. irus*, Godt. Locally common near Calgary.

48. *T. eryphon*, Bd. A few specimens near Billings's lumber mill. Early June. Banff, May 24th (Sanson).

49. *T. dumetorum*, Bd. Mr. Elwes tells me he took a specimen of this species in the foothills, about 50 miles S. W. from Calgary (about May 12th, 1895?).

50. *T. titus*, Fab. Rare and local in the hills around Pine Creek. Very common in foothills near Lineham's lower log camp. August. Lacombe, July 28th, fairly common (Gregson).

51. *Chrysophanus xanthoides*, Bdl. Very rare. Head of Pine Creek, July.

52. *C. thoe*, Bdl. Locally common on low, wet ground amongst the hills on Pine Creek. July.

53. *C. mariposa*, Reak. Common near the spruce. Also at Banff and Laggan. July and Aug.

54. *C. helloides*, Bdl. Common. June and July. A second brood in far fewer numbers in September. Both Mr. W. H. Edwards and Dr. Fletcher refer my form to *florus*, Edw. I have specimens in

my series agreeing well with specimens sent me by Mr. Lyman as typical *helloides*, labeled "California and Washington."

55. *C. phlœas*, Bd.-Lec. Taken on July 5th and 12th, 1896, by Mr. Hudson, both near Billings's lumber mill and Lineham's lower log camp on Sheep Creek. In all, six specimens in fine condition. It is probably locally common. Dr. Holland has three of these specimens. He says: "They are undoubtedly *phlœas*, the European form, closely corresponding with specimens which I have from Turkestan on the upper side, but show some modifications on the under side that are of interest. I have no doubt that *C. Americana* grades over into *phlœas*, and that when we come to know all about the distribution of the species, we shall see that our eastern *Americana* is a local race of the European species, and our north-west country will undoubtedly furnish us with the connecting links between the palæarctic and nearctic forms."

56. *C. Snowi*, Edw. Laggan, in August (Bean). I took a worn specimen there myself on August 10th, 1900, at about 7,000 feet.

57. *C. sirius*, Edw. Recorded in Holland's "Butterfly Book" from Macleod.

58. *Lycœna fulla*, Edw. Common, end of June and July. Lacombe, June 16th, local (Gregson).

59. *L. sœpiolus*, Bd. Common, end of May to early July. Also at Banff and Laggan.

60. *L. Couperii*, Grote. Extremely common everywhere. On the wing from the end of May, nearly all summer. Probably two broods at least. Earliest record, May 12th. Mr. Elwes tells me that this is the Calgary form of *antiacis*, Bd.

60a. [*L. lygdamus*, var. *oro*, Scud. Mr. Gregson has shown me Lacombe specimens which Dr. Fletcher thinks are referable to this species. In some of them the spots beneath are almost wanting, but though I cannot exactly duplicate them in my Calgary series of *Couperii*, I doubt their distinctness from that species. I certainly cannot distinguish the specimens standing in Mr. Sanson's collection as *lygdamus* from *Couperii*.]

61. *L. sagittigera*, Feld. A single ♂, perfectly fresh, on June 19th, 1900, in the poplar woods at head of Pine Creek.

62. *L. rustica*, Edw. Common everywhere. June and July.

63. *L. shasta*, Edw. A single specimen on the Bow bottom, near the mouth of Fish Creek, on June 21st, 1894. The name is on the authority of Mr. W. H. Edwards. Visits to the locality since have failed to produce any more.

64. *L. melissa*, Edw. Common, end of May to August. A remarkably variable species. I have had the names *Scudderii* and *Anna* from Mr. Edwards, and have seen Banff specimens, labeled *Scudderii* by Dr. Fletcher, which agree with specimens in my series. I picked out some half dozen specimens showing the range of variation as much as possible and sent them to Dr. Skinner, who wrote: "They are all undoubtedly one species, and are a little off typical *melissa*, and near to var. *Annetta*." Mr. Gregson takes the same species at Lacombe. Judging from Mr. Edwards's opinion about certain forms I sent him, it is not unreasonable to suppose that the record of *Anna*, Edw., from Belly River, refers to this species.

65. *L. acmon*, Doub.-Hew. Banff, Aug. 7th (Sanson). I have seen this species, and believe it to be distinct from anything else here listed.

66. *L. pseudargiolus*, Bd.-Lec. I have a specimen taken by Mr. Elwes within a mile of my house, on May 24th, 1895, but neither Mr. Hudson nor myself have ever taken it. Mr. Gregson records vars. *marginata*, Edw., and *lucia*, Kirby, from Lacombe (end of May, not common), and Mr. Sanson says he takes var. *lucia* at Banff (May 25th).

67. *L. amyntula*, Bd. Common in June, especially near the spruce. Lacombe, in river bottoms, June, not common (Gregson). I have seen Lacombe specimens which Mr. Gregson has under *comyntas*, but cannot separate them from what I have as *amyntula*.

68. *Pieris sisymbri*, Bd. Rather rare on Pine Creek. May and June. Also at Banff and Laggan.

69. *P. protodice*, Bd.-Lec. June and August. Double brooded, the second brood being fairly common. The commonest form here agrees with *protodice*, as described in French's "Butterflies of the Eastern U. S. and Canada," but Dr. Fletcher gave me the name *occidentalis* for this form, which is also like *occidentalis*

mentioned in Holland's "Butterfly Book." *Protodice*, as there described, has secondaries beneath immaculate white in the ♂. This form occurs here rather sparingly. Scudder, in his "Brief Guide," treats them as one species, and though I doubt their distinctness, I have not sufficient local material at hand to form a definite opinion. Mr. Gregson reports *protodice* from Lacombe, "July 27th, uplands, scarce." *Occidentalis* occurs at Banff. August (Sanson).

70. *P. napi*, form *oleracea*, Harr. Fairly common; single brooded only, June and July. Mr. Edwards calls my form "*oleracea*, form *virginiensis*." It is somewhat variable, the variation probably ranging between the two forms. Mr. Gregson reports *oleracea-hiemalis* from Lacombe. "July, rather common in meadows and gardens." Mr. Sanson reports *oleracea* and *venosa* from Banff. I have seen a ♀ from Banff, dated May 3rd, which is darker than *bryoniæ*, Ochs., in Holland's book.

71. *P. rapæ*, Lin. Two specimens taken: ♂, July 20th, 1899; ♀, June 26th, 1900. No more observed.

72. *Anthocharis ausonides*, Bd. Common on the hill-prairie, end of May and June. Banff, May 17th (Sanson); Lacombe, July 19th, woodlands, scarce (Gregson).

72a. [*A. creusa*, Doub.-Hew. I have seen a Banff specimen, dated June 15th, agreeing closely with plate and description of *creusa* in Holland's "Butterfly Book." I refrain from listing it as an undoubtedly distinct species. One out of a large series of Calgary *ausonides* comes very near this specimen on the under side.]

73. *Colias elis*, Streck. Laggan (Bean); Banff, taken by Mr. H. H. Lyman and Mr. H. K. Burrison in 1890 (Bean). It cannot be common there, as Mr. Sanson does not record it. Mr. A. F. Hudson took two fine ♂ ♂ in the foothills at the "Lineham's lower log camp" locality on July 12th, 1896. According to Mr. Bean, the record of the *Meadii*, by Geddes, from the Kicking Horse Pass, probably refers to *elis*.

74. *C. eurytheme*, Bd. Lacombe, fairly common; August (Gregson). Common on Pine Creek in June, 1900, though not observed near Calgary in previous years. The unexpected appearance of

true *eurytheme* in considerable numbers here last June is a mystery, as it is extremely unlikely that amongst the large numbers of *christina* and *eriphyle* taken by Mr. Hudson and myself during the previous seven seasons, we should never before have taken anything resembling *eurytheme* had it occurred here annually. *Eriphyle*, which is here a very much smaller and pale lemon-yellow form, was flying at the same time, as well as *christina*, but *eurytheme* was not observed when the second brood of *eriphyle* appeared as usual in August. They agree well with *eurytheme*, from S. Dakota, and specimens have been submitted to Dr. Skinner for examination, so there is no doubt as to their identity. Of about 20 specimens taken, all except two ♀ ♀ show signs of much flight, and I at first thought they might be migrants; but Mr. Hudson, their captor, tells me that they were on the wing here for some time before he noticed that they were not *christina*. Of seven or eight ♀ ♀ taken, three were albinos.

Var. *eriphyle*, Edw. Very common; end of May and June, and again in August. I have taken fresh specimens in July. Also at Lacombe (Gregson) and Banff (Sanson).

75. *C. christina*, Edw. Common; June and July. Lacombe, August (Gregson) and Banff, August (Sanson). The pale lemon-yellow form of the ♂ is rather rare near Calgary, but is, I believe, more common in the mountains. The ♀ ♀ show most extraordinary variation. It is hard to find two alike. I have a specimen, I believe sexually a ♀, having the right side normal, of the pale, almost immaculate yellowish white variety, and on the left side showing a tendency to become an orange ♂, in having irregular dashes of orange in several places on both wings, and patches of distinctly ♂ brown marginal band near the apices.

75a. [*C. occidentalis*, Scud. Lacombe in August, fairly common (Gregson). The name is on the authority of Dr. Strecker. Mr. Gregson sent me three ♂ ♂ and one ♀ as *occidentalis*. The ♀ and one ♂ I believe to be *christina*. The other two ♂ ♂ are certainly very near *christina*, but differ in more than one respect from any form of that species that I have taken near Calgary. Until I can examine more material, this form must stand as doubtful.]

76. *C. pelidne*, Bd. Apparently fairly common in the spruce in July. Dr. Holland writes: "Your specimen agrees positively, point for point, line for line, and dot for dot, with a specimen labeled in the Edwards collection as *C. interior* ♂, coming from Godbout Bay, though both this specimen and yours strike me as being somewhat off type." Dr. Skinner says: "It comes nearest to *interior*, or perhaps *eriphyle*." Mr. Elwes says it "belongs to the *pelidne* group." He writes later concerning the species: "Some forms are locally constant. Yours is near, and perhaps runs into, *christina*." It certainly is near *christina*, but, so far as I have observed, remarkably constant in colour, which *christina* is not. I have not often had a chance of taking it, and have only two ♀ ♀, very much alike, and differing from any ♀ *christina* that I have taken nearer home. The first time I took the species I took ♀ ♀ flying with *pelidne* ♂ ♂, and submitted both sexes to Mr. Elwes, who questioned their unity. As I saw no *christina* ♂ ♂ on that day, I believed them to be one; but the subsequent receipt of the two above-mentioned ♀ ♀ from Mr. Hudson convinces me that the original ♀ ♀ taken were not of this species.

Var. *Skinneri*, Barnes., = *C. minisni*, Bean, MSS. Common at Laggan. I took ♂ ♂ in fine condition there on August 8th and 10th of last year, between 5,500 and 7,000 feet, but saw none either higher or lower. It may certainly be a small and locally constant var. of *pelidne*, but I find it hard to associate it thus closely with what I have as that species. The discal spot on primaries in all my *minisni* is more narrowly linear, the marginal band narrower, and secondaries and basal area, as well as the under side, more widely sprinkled with black scales.

77. *C. nastes*, Bd. Laggan, above timber (Bean). I was fortunate in taking four ♂ ♂ and two ♀ ♀ of this species, in fine condition, during my short stay at Laggan last August. I met with it at about 7,000 to 7,600 feet, on Slate Mountain, on August 8th. Two days later I took a fine ♂ on "Saddle Back," near Lake Louise, flying with *minisni*.

78. *Parnassius smintheus*, Doub.-Hew. Mr. Hudson took over a dozen specimens, both sexes, on July 12th, 1896, at Lineham's lower camp on Sheep Creek, where he says it was abundant. It

occurs at both Laggan and Banff. My ♀ ♀ (from Sheep Creek) are slightly darker than the figures of *smintheus*, in Vol. III. of Mr. Edwards's work, but not so dark as *hermodur*.

79. *Papilio zolicaon*, Bd. On the hill-prairie around Pine Creek; not common; June. Also at Olds (Willing).

80. *P. nitra*, Edw. Fairly common on the hill-prairie and in river bottoms. End of May and June. Also at Olds (Willing). I have a Calgary specimen labeled *asterias* by Mr. Edwards, but both Dr. Fletcher and Dr. Holland agree in referring the species to *nitra*.

81. *P. turnus*, Lin. Fairly common everywhere. June.

82. *Carterocephalus palæmon*, Pall. Fairly common locally near the spruce in June. Laggan (Bean); Banff, June 5th (Sanson); Lacombe, July 19th, not common (Gregson).

83. *Thymelicus garita*, Reak. Common on Pine Creek.

84. *Pamphila comma*, var. *Manitoba*, Scud. Common near Calgary. End of June to August. Have taken it at Banff in August, var. *Assiniboia*, Lyman. Far less common than *Manitoba*.

85. *P. uncas*, Edw. Far less common than the preceding species. June and July.

86. *P. draco*, Edw. Rather rare near Calgary. July. I took a specimen at Laggan in August.

87. *P. peckius*, Kirby. I have a single ♀ labeled "Pine Creek," but bearing no date, called *peckius* by Mr. Lyman, and agreeing with *peckius* from Ottawa. I have rather neglected the Pamphilas, and some species may be more common than I suppose.

88. *P. mystic*, Scud. Fairly common on the hill-prairie; June and July.

89. *P. cernes*, Bd.-Lec. Probably local, and apparently not very common, though I have no records of exact localities.

90. *Pyrgus tessellata*, Scud. By no means common; end of June and July. Mr. Gregson records *montivagus* from Lacombe. I have not seen his species, but suspect that he refers to *tessellata*.

91. *P. cæspitalis*, Bd. Banff; June 3rd (Sanson). I have seen this species.

92. *Nisoniades icelus*, Lint. Common everywhere around Calgary; middle of May to end of June. I have the name *brizo* from Dr. Fletcher, but have carefully examined a large number of specimens, and

find the pencil of hairs present on hind tibiæ in all. Dr. Skinner's report on specimens that I have sent him convinces me that I do not take *brizo*.

93. *N. persius*, Scud. Common everywhere around Calgary. Also occurs at Banff (Sanson), middle of May and June. Dr. Fletcher labeled a specimen I sent him "*lucilius*, I believe," but Dr. Skinner, who has both species named by Dr. Lintner, considers my form *persius*. Mr. Gregson records *lucilius* from Lacombe. As Dr. Fletcher probably gave him the name, I suspect that the species he takes there is *persius*.

94. *Eudamus pylades*, Scud. Local and not common. Has been taken at head of Pine Creek and near Billings's lumber mill. June.

(To be continued.)

HOW TO GET RID OF FLEAS.

Reading in the April number of the CANADIAN ENTOMOLOGIST, Mr. Heath's account of the plague of fleas in Manitoba, recalled what I had read in the *Agricultural Gazette* of New South Wales. It appears that in the Australian bush fleas are as great a nuisance as they are in some parts of Manitoba. A settler, who had suffered greatly from their presence, wrote to the *Gazette* that he had occasion to use tar paper in his dwelling, when he discovered that fleas would not stay in the house with it, and from that time he had no more trouble with fleas in his house, although they were as plentiful out of doors as ever. Last autumn, or early winter, one of our local members, on his regular visit to the Society's room, started the enquiry as to what was the best way to get rid of fleas, as his house had got overrun with them from having allowed their dog to sleep in the cellar. I thought of what I had then recently read, hunted up the number of the *Gazette*, found the reference, and showed it to him, when he said he would try it. The next time he called he reported that it had "worked like a charm," and he at once got rid of the fleas. So here seems to be a clean, cheap, and, so far as tested, an effectual means for those afflicted of getting rid of the cause of great discomfort.

J. ALSTON MOFFAT.

NOTE ON THE RESPIRATION OF ALEURODES CITRI.

BY C. W. WOODWORTH, UNIVERSITY OF CALIFORNIA.

The effort to control the " white fly " of the orange *(Aleurodes citri)* by hydrocyanic acid gas, naturally suggested an inquiry into the respiration of these insects. The author was enabled to pursue this inquiry, while recently in Florida, under the auspices of the Florida Agricultural Experiment Station.

The only account of the organs of respiration in the young of this family is a brief note with a figure in Burmeister's Handbuch, which is very incomplete and not entirely accurate. Some very interesting and quite unique features are presented by these insects, not the least of which are the breathing folds, that are very conspicuous structures, and have been heretofore incorrectly interpreted. The view suggested by Riley and Howard (Insect Life, 1893, Vol. 5, pp. 219–226), that the anterior folds represent the original division between the head and thorax, is the one usually accepted. In reality they are wholly thoracic in position, being nearer to the pro-mesothoracic line than to the head-thoracic boundary, and they are by no means vestigial structures, but specially developed organs of respiration.

The necessity of these organs is very evident when it is noted that the spiracles open ventrally, and that the body is cemented to the leaf. The insect is nearly transparent, and very inconspicuous as it lies upon the leaf, but if the leaf is bent so that air is admitted beneath it, the insect immediately becomes whitish. An examination of the inverted insect under the microscope shows the ventral surface to be marked off into polygonal areas, with many round regions resembling glands. These correspond exactly with the cells and stomata of the leaf, and are, in fact, a mould of the surface upon which the insect rested, produced doubtless by the hardening of the secretions of the marginal glands.

The breathing folds are the only passages between the outside air and the spiracles; and they are really structures showing quite high specialization. The surface of the lumen of the groove is armed with minute scattered chitinous papillæ, and thus differs strikingly from the structure of any other part of the skin of the insect. The outer opening is guarded by a pair of oblique combs. They are produced by a modification of the serrations that elsewhere form the border of the body, and recall the guard-combs

developed at the opening of the spiracles in many insects; they evidently serve the same function. The body of the insect is so thin that towards the edge its dorsal as well as its ventral wall is involved in the production of the fold. The inner ends of the breathing folds enlarge into conspicuous chambers, since each fold serves for more than one spiracle.

There are four pairs of spiracles present in the young of an Aleurodid, though Burmeister recognized only the anterior two pairs. He saw, indeed, the anal pair, but incorrectly identified them as sexual orifices, which he describes as being on either side of the anal opening. At this stage there are no vaginal openings, though the eggs can be clearly seen quite fully formed just anterior to the anal pair of spiracles long before the final moult. The anal opening is on the dorsal surface, and therefore really very far distant from the ventrally placed spiracles.

The anterior folds are opposite the anterior pair of spiracles, which lie between the bases of the developing front and middle legs; these project in regular curves in nearly opposite directions. The tips of the rudiments of the middle legs reach nearly to the base of those of the hind legs; in these intervals lie the second pair of spiracles. The third pair of spiracles lie just beyond the tips of the rudiments of the hind legs. All these are served with air by the anterior breathing folds, the three spiracles on each side opening into the three-chambered basal enlargement of the fold on that side. The fourth pair open on a Y-shaped expansion of the anal breathing fold.

The main portion of the tracheal system consists of a ventral trunk on either side reaching from the anterior to the posterior spiracle, two dorsal girdles connecting with each other the spiracles of the anterior two pairs, and on either side of the abdomen and metathorax a dorsal trunk reaching forward from the anal spiracle to about half way between the second and third pairs of spiracles, where they unite with the ventral trunks. Burmeister recognized the anterior portion of the ventral trunk and the dorsal girdles, and figures them quite accurately, but he did not make out the whole system.

The finer branches are given off as follows: The anterior spiracles lead into a trunk that almost immediately divides into two main branches, one of which quickly subdivides into about thirty-four long twigs, which spread out fanlike and serve the sides of the body from almost the middle line of the front around the sides to about the middle of the thorax. The

other main branch at once gives off the anterior dorsal girdle, and soon after divides into two about equal branches, one of which is the ventral trunk, and the other proceeds directly towards the mouth. This cephalic trachea divides into two main branches, the dorsal one of which subdivides into about eight long convoluted tubes that supply the sides of the head, the other proceeding almost to the mouth-opening, sweeps around in a conspicuous curve of over 90°, and then, breaking up into about three twigs, continues straight forward to the edge of the body.

The trunks from the second pair of spiracles divide each into two main branches, each of which gives off a small branch, the lower anteriorly and the upper posteriorly; these branches at once divide into a small number of convoluted twigs serving the immediately adjacent viscera. The ventral branch proceeds to the ventral trunk, and the dorsal forms the dorsal girdle. The third spiracle opens into a trunk that immediately divides into an external and an internal branch. The external branch soon separates into an anterior and a posterior division, each of which breaks up into about twelve long twigs, serving the edge of the body along the posterior part of the thorax and anterior part of the abdomen. The internal branch proceeds to the ventral trunk, but first gives off a small branch, which serves the adjacent viscera with about five convoluted twigs. The anal spiracles are nearly as large as the anterior ones. From each arises a ventral and a dorsal trunk, and at the point of separation a third main branch at the side. From this branch arise successively a series of about twenty-five long twigs serving the sides of the abdomen. Besides these tracheæ there are a few convoluted visceral branches given off from the trunks as follows: About eight on the anterior dorsal girdle, the same number on the anterior section of the ventral trunk, two on the middle division, and about eight in the posterior section, and the dorsal trunk gives rise to about four in the abdomen. These branches, counting those on the two sides of the body, amount altogether to about 264 twigs. The finer tracheæ divide rarely, if at all, and are quite constant in their numbers.

Some of the most striking points in this tracheation are: The sharp distinction both in structure and origin of the visceral and lateral twigs; the fact that the twigs from one spiracle rarely invade the territory occupied by those of another; and, most peculiar of all, that the twigs

from the second pair of tracheæ do not serve the border at all, but confine themselves to the region of the developing imaginal appendages.

The withdrawal of the spiracles so far from direct contact with the outer air produces a condition of isolation that should influence the results of experiments with such material as hydrocyanic acid gas. Such was found to be the case. While the insect is quite easily killed by rather smaller charges than is considered necessary for efficient work with scale insects, the time of exposure required is distinctly longer. It at least suggests the possibility that considerable time is necessary for the diffusion of the poison through the air of the breathing folds before reaching the body.

INSECTARY REARINGS OF TWO SPECIES OF MORDELLISTENA.

BY F. M. WEBSTER, WOOSTER, OHIO.

Mordellistena pustulata, Mels., was reared June 6th, 1899, from stems of *Ambrosia trifida*, Giant Ragweed, collected October 13th, 1898. From the same species of plant collected November 10th, 1899, this insect was reared April 4th, May 12th and 31st, 1900.

Mr. Coquillett has found larvæ of this species in plant stems, under circumstances that render it highly probable that they were feeding on Lepidopterous larvæ. The stems of the Giant Ragweed are populated by Lepidopterous, Dipterous, Coleopterous and Hymenopterous larvæ. In my case only by Coleopterous and Hymenopterous larvæ.

Mordellistena limbalis, Mels., was reared March 16th, 1901, from thorns of the Honey Locust, collected February 20th, 1900. No other insects had been reared from these thorns.

Mr. Schwarz thinks that the larvæ of *Mordellistena Floridensis* live in the stems of plants, deriving their nutriment therefrom; while Mr. Osborn found similar larvæ probably feeding on Dipterous larvæ, and also in plant stems.

MR. A. W. HANHAM has recently been removed from Winnipeg. His address is now: Bank of British North America, Victoria, B. C.

SOME ORIGINAL DESCRIPTIONS BY GUENÉE.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

The supposed "types" of Guenée in the British Museum have been examined, with the result that some well-established names of Noctuids have been displaced by an uncertain determination. Guenée's collection, which I saw in Chateaudun during the lifetime of the author, is now with M. Oberthier, and should be looked through. But the only evidence we have which is vital is the original description; where this is inapplicable the name should not be used. Only on this evidence can we assume that any of the British Museum specimens are the real types of either Walker or Guenée, because the collections have not been kept intact as Walker left them, and because no type labels were attached by the latter to the specimens. In these pages I have, I hope successfully, rehabilitated *Mamestra lubens*, and, by publishing the following translations, perhaps other undoubted names may be restored to their rights. I maintain, for instance, that whatever may be written on the subject, a name like *Apatela subochrea* should always be retained for the species, in reference to the contradictory opinions which have appeared in print. What we want is certainty in designating the object, and, when circumstances clearly admit of doubt and authors disagree, the *sure* title should be preferred in every case. There is now far more confusion as to specific titles of our Noctuids than formerly, when the current determinations were mainly supplied by me.

1. *Leucania insueta*, Guenée, I., 81.

"32. mm. This has much resemblance to *obsoleta*. Fore wings appearing a little less pointed at apices. They are darker; there is a small basal black line beneath median vein. The dots forming the t. p. line are more confused, more oblong, and the line is strongly deflexed at costa. The white cellular dot is hardly legible; finally the ends of the nervules are white to the fringe, where the streaks broaden a little. Hind wings blackish-gray, nowhere white. All the wings darker beneath. New York; coll. Doubleday. A single poor male."

This description does not fit *adonea* at all, which I believe to be distinct from any species described by either Guenée or Walker.

2. I append here Guenée's description of what is now commonly called *Agrotis ochrogaster* in the Canadian Reports. Since *A. turris*, Grote, and its red form, *A. gularis*, are common, this description might be

compared, and if it can be made to apply to any one example, then *ochrogaster* may be confined to the species; if not, then it seems to me not. As to *illata*, Walker, Canadian specimens seen by me so labelled were *suffusca*, to which Walker's description might well apply. It would require evidence to make me believe that Walker's supposed type in B. M. is authentic.

"A little larger than *plecta*, which it resembles in markings." (It seems to me this cannot well be said of *turris*.) "The red of primaries is paler" (this is, then, a reddish form, like *gularis*), "and the subterminal line is well marked by a dark blackish shade. The terminal dots are rounded and separate; the fringe is divided by a dark line; the spots are much larger; the reniform less constricted, and the median vein evenly white." (This latter does not seem to agree with *gularis*.) "Hind wings with a very distinct terminal series of rounded dots. Collar ochrey white, as also the abdomen, which is unicolorous and without the terminal reddish tuft (*i. e.*, of *plecta*). Am. Sept.; coll. Bdv.; one male."

The comparison by Guenée with *plecta* led me to seek for a form more resembling *plecta* than either *turris* or *gularis*. This is a matter to be left to some unprejudiced observer, who will compare sufficient material with above description. *Agrotis turris* seemed to me allied to the Californian, *A. Wilsoni*.

3. *Catocala micronympha*, Guenée, III., 102.

"Shape and form of *protonympha*, which it is very near, and from which it is only distinguished by slight, though constant, characters. Such are the more pointed apices, more brownish shade of colour, the shape of t. p. line, the band of hind wings more angulate, the [markings of the] base of primaries beneath, the thinner palpi, etc. Fore wings slightly dentate, costa arching outwardly, apex quite sharp; of a chestnut brown, varied with whitish-gray and blackish. The two median lines distinct, but narrow, separated above and approaching below; the t. p. line forming, at end of cell, a strong bend, with two teeth, of which the inferior is almost obsolete, after which the line is nearly regularly waved, without any inward bending below submedian vein, which latter is shaded with black throughout its length. Reniform replaced by a simple black mark. Median shade well marked, but interrupted on cell, and turning thence towards terminal margin, where it stains with blackish

two or three of the veins. Subterminal whitish, waved zigzag, nearly perpendicular, touching in passing the principal tooth of t. p. line. Hind wings dark yellow, with broad arcuated border, interrupted at usual place to form an anal spot; a narrow median band a little angulated, and two rays of blackish hair joining it. Beneath the band is broader, especially at costa, near which it nearly attains, or is joined, to the base. Fore wings beneath entirely yellow to the first black band. Am. Sept.; one male."

We could not fit this with *fratercula*, G. & R., on account of the chestnut brown primaries, and some other points. Where Guenée compares with a European species this latter should be procured and used to check the identification.

4. *Catocala Belfragiana*, Harvey.

This name has been supplanted by *messalina*, whereas the description of the latter presents an important difference of the band on secondaries. Possibly Guenée's species is something quite different, and I protest against the use of *messalina* for this species until Guenée's type is compared, or a variety of *Belfragiana* is turned up which is covered by Guenée's description of *messalina*.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

The following list of the Coccidæ found to inhabit Canada is complete, so far as the published records show, together with some other information derived from corresponding with Prof. Cockerell, Dr. Fletcher, and Mr. John Dearness. Much, however, has been obtained from material sent to me for identification. In reviewing the list it will be seen that Ontario has 25 species of Coccids credited to her; while Ottawa has 18; Toronto, 6; Quebec, 3; Prince Edward Island, 3; Nova Scotia, 4; New Brunswick, 2; and British Columbia, 6. One has been found in an ants' nest, 8 in greenhouses, and there have been 8 new species described from Canada. There are 46 species, 27 of which are native to North America, 14 are introduced, and 4 whose home is unknown, but which were probably introduced. The large majority of the species have been found by Dr. Fletcher, or at least have passed through his hands. Much credit, however, is due Mr. John Dearness, who has taken great interest in looking for these very injurious insects,

and has sent me several very interesting species. The following als deserve mention, who have found one species each: Messrs. John Morley R. J. Crew, A. H. McKay, and Rev. G. W. Taylor. Of the 46 specie cited, I have had the pleasure of studying 36. The bibliography give refers only to such works as make mention of British North America species.

COCCINÆ.

Eriococcus, Targ.-Tozz.

Eriococcus borealis, Ckll., 1899. (Native.) Found on willow (Salix) a Dawson City, 64° N. Lat., by Mr. John Morley.

Bibl.—CANADIAN ENTOMOLOGIST, Vol. xxxi. (1899), 370. Orig nally described from Dawson City, British North America.

Phenacoccus, Ckll.

Phenacoccus Dearnessi, n. sp. (Native.) Sac white, the sac wholl covering the body. ♀ dark red-brown. Boiled in caustic potash th derm is colourless. Legs and mouth-parts ochreous. Antennæ pal yellow, 9-jointed: 3 longest, although 2 + 3 are sometimes equal, next and a little longer than 1, 5 + 8 next and equal, 6 + 7 ar shortest and equal. The joints are quite variable in length, as will b seen from the following measurements:

Joint	1	2	3	4	5	6	7	8	9	
	40	56	60	28	44	36	36	32	60.	Formula (39)215(67)84.
	40	60	60	32	26	28	28	32	52.	" (23)915(48)(67)
	40	52	52	40	40	28	28	32	52.	" (239)(145)8(67)
	44	56	52	24	36	32	56	60	an 8-jointed form, hardly adult.	

Legs short, stout.

Middle leg: coxa, 80; fem. with troch., 180; tibia, 116; tarsus, 72; claw, 24.
Hind leg: " 88; " " 200; " 148; " 84; " 24.

Scattered over the body are several long thin hairs and short thick spines. The gland-pits are not numerous, and are very small. Caudal tubercles large, round, with two long setæ, and several long thin hairs; the tubercles are well covered with short, stout, spear-shaped spines. Young larva: Antennæ 6-jointed, measuring as follows: Joint—(1)24. (2)32. (3)40. (4)24. (5)24. (6)68.

Hab.—On an old hawthorn tree near London, Ontario, June, 1900. Collected by Mr. John Dearness, to whom the insect is dedicated. This species is allied to *P. gossypii* and *P. helianthi*, but differs from both in the legs being much shorter, and in the colour of the legs and antennæ.

(TO BE CONTINUED.)

NEW GENUS INCLUDING TWO NEW SPECIES OF SALDIDÆ.

BY HERBERT OSBORN, OHIO STATE UNIVERSITY, COLUMBUS, OHIO.

SALDOIDA, nov. gen.

Head narrower, eyes nearer together than in Salda, ocelli approximate, frontal ridge weak, becoming obsolete at base of tylus, bucculæ enlarged; antennæ with the two distal joints incrassate, rostrum as in Salda, basal joints very thick, second elongate, terminal very slender. Prothorax bearing two very prominent conical tubercles on anterior lobe, which is narrow, cylindrical, not carinate anteriorly; posterior lobe short, carinate laterally, widening rapidly to humeri.

SALDOIDA SLOSSONI, n. sp.

Hind angle of pronotum obtuse, not produced into a sharp angle or horn. Light brown, marked with reddish-yellow and black, face testaceous. ♀—Length to tip of elytra, 3 mm.; width at humeri, scarcely 1 mm.

Head obtusely triangular, subcordate, inclined, the part in front of the eyes nearly equal to eyes in length, very sparsely set with erect hairs; eyes large; vertex narrow, less than width of eye; ocelli minute, set close together; antennæ long, joint two longer than one, equal to three, three much swollen, four equalling one in length, and about half as thick as three; rostrum reaching to apex of hind coxæ. Prothorax with two very large, erect, conical tubercles occupying the upper surface of the anterior lobe; posterior lobe short, much widened behind, concavely emarginate, the lateral angles obtusely angulate. Scutellum large, anterior border convex, surface polished, minutely punctate, apex inflated, highly polished. Elytral membrane subhyaline, with four cells and a wide margin, wings reaching to tip of elytra, milky hyaline.

Colour: Vertex black, with margins next eyes red-brown; face and rostrum testaceous; antennæ, basal two-thirds of second joint and all of third fuscous, apex of one and two whitish, fourth yellowish brown, darker at base and minute tip; prothoracic tubercles red-brown, posterior lobe yellowish brown, anterior margin and band back of the tubercles black; scutellum black, apex piceous brown; elytra brown, claval suture and apical margin of corium black, corium with two triangular whitish spots, the bases of which merge into the hyaline costa, membrane with fuscous base and hyaline apex; beneath black, with throat, pleural pieces, coxæ and legs yellowish brown, darker on disc of coxæ, apical portion of femora

and base of tibiæ, the apex of tibiæ and last joint of tarsus, fuscous; margin of last ventral segment whitish.

Described from one specimen (♀) from Florida, collected by Mrs. Annie Trumbull Slosson, to whom it is most respectfully dedicated. This and the following, which are certainly most exquisite little creatures, have been in my hands for some years, but publication of the descriptions has been deferred in hopes that additional material, representing both sexes, might make more perfect descriptions possible. It seems desirable, however, that they should not be omitted in a systematic work on the family such as is now being prepared by Prof. Summers, and hence their publication at this time.

SALDOIDA CORNUTA, n. sp.

Hind angles of pronotum produced into conspicuous horns. Black, marked with brown. ♀—Length, 2.5 mm.; width at humeri, .75 mm.

Vertex and front minutely gibbous, sparsely set with short appressed hairs; ocelli minute, approximate; antennæ with joints one, two and four nearly equal in length, joint three about one-half longer, and much swollen, fourth less swollen; rostrum about reaching hind coxæ. Conical tubercles of the pronotum very slightly divergent, otherwise almost precisely like those of *Slossoni* in shape; the posterior lobe of pronotum very short, posterior angles produced into prominent upturned horns, with a blunt polished tip. Scutellum minutely roughened, becoming smooth at apex, not inflated. Elytra subhyaline on costa, the membrane rather coriaceous, with veins obsolete, apparently with three cells and rather narrow margin. Wings aborted, unless accidentally broken off in this specimen.

Colour: Vertex, front, third joint of antennæ, prothorax except posterior horns, scutellum, claval sutures and apex of corium, pectus and base of last ventral segment, black; clypeus, rostrum, joints one, two and four of antennæ, posterior horns of pronotum, coxæ and apices of femora, reddish brown; a brown patch on disc of clavus and base of corium, a whitish oblique spot on corium merging into the hyaline costa. Membrane deeply infuscated; the first and fourth joints of antennæ are widely whitish, as also the hind coxæ, base of femora and the apical two-thirds of last ventral segment, the central part of which is transparent, showing ovipositor clearly.

Described from one specimen (♀) collected by Mrs. Slosson in Florida.

AN EXPERIMENT IN THE IMPORTATION OF BENEFICIAL INSECTS.

BY F. M. WEBSTER, WOOSTER, OHIO.

In the February number of the CANADIAN ENTOMOLOGIST I gave the results of an experiment in the exportation of a few of our native lady beetles to South Africa. I now have the pleasure of giving the result of an experiment in the importation of some South African lady beetles.

March 27th, Mr. C. W. Mally, Assistant Government Entomologist, sent me several specimens of *Exochomus nigromaculatus*, and quite a large number of two smaller, unnamed species. All of these attack more especially the Mealy bug, *Dactylopius*, in their native home. The consignment was made by simply fastening twigs of Oleander very badly affected with Mealy bug, to the bottom of the box, and putting the lady beetles among them. The package reached me April 23rd, and, strangely enough, there were but very few of the specimens that were not alive and active. The importation was thus an entire success. Mr. Mally writes me that, about Cape Town, these lady beetles are kept considerably reduced in numbers by a small Hymenopterous parasite. In releasing the lady beetles, we took precautions not to allow these parasites to escape, so that the insect, if it secures a foothold in this country and stands the climate, will have no natural enemies to hold it in check. In cases like this, and more especially in the one previously recorded, any permanent establishment of these insects would be to a certain extent accidental; that is, in the former case the lady beetles were not sent out to prey upon an insect in South Africa, whose original home was in America. In the present instance these lady beetles will probably destroy the Mealy bugs in conservatories, but it is yet to be determined whether they can withstand the rigours of our northern climate in the open. Very many injurious species are introduced and become established in this country through pure accident, and it would seem that we might expect an occasional instance of this kind to occur among beneficial insects intentionally introduced; but the principal motive in these two transactions has been, not so much with a view of colonizing these insects in the respective countries, as to secure information that would be of service to us in future transactions of this kind.

These experiments cost practically nothing, and through them we shall be able to get a better idea of the best methods of sending beneficial insects from one country to another, so that when an opportunity does

occur, where we may feel reasonably sure of success, we shall be in better shape to send insects of this character in a manner most likely to enable them to reach their destination with the least number of fatalities while in transit. It is by this continually doing something that we are some day enabled to accomplish much.

THE LINNÆAN GENUS GRYLLUS—ADDITIONS AND CORRECTIONS.

Quite recently I was kindly informed by Mr. S. H. Scudder, that in my paper on the divisions and species of the original genus *Gryllus* (CANAD. ENT., XXXIII., pp. 118–121), I had overlooked the fact that Fieber's paper had appeared in Lotos in 1853. With the information furnished by Mr. Scudder, I examined the work, and found that *Mecostethus* appeared in the May number, on page 99, and *Pachytylus* and *Psophus* in the June number, on pages 121 and 122, respectively. This fact further clinches the Linnæan *Locusta* on Fischer's *Stenobothrus*.

The date given for Thunberg's *Gomphocerus* is erroneous, and should be 1815, while the original spelling of Bolivar's "*Humbella*" is *Humbe.*

JAMES A. G. REHN, Philadelphia.

ERRATUM.—Page 129, line 15, for "*Ziphidium*" read *Xiphidium.*

Mailed June 3rd, 1901.

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General Index

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EGGS AND LARVA OF ALSOPHILA POMETARIA, PECK.

The Canadian Entomologist.

VOL. XXXIII. LONDON, JULY, 1901. No. 7

NOTES ON THE LIFE-HISTORY OF ALSOPHILA POMETARIA, PECK.

(Fall Cankerworm.)

BY W. E. HINDS, B. S., ENTOMOLOGICAL LABORATORY OF THE MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.

The eggs of this insect were found on a small branch of golden willow in Beverly, Mass., March 14, 1900, in a nursery, close to fruit stock of various kinds. The mass, consisting of 220 eggs, was kept at the temperature of the laboratory, which was considerably higher than that outside. Notwithstanding this fact, none of the eggs hatched till April 23, within forty-eight hours of which time, however, all the larvæ had emerged.

Egg (Plate 4, Figs. 1 and 3).—Eggs placed close together in regular rows, forming a compact mass, in this case about twice as long as broad and in one layer. Egg about .6 mm. long and .45 mm. broad at top, which is nearly flat. Just inside the rounded edge of the top a brown ring encloses an area bright steely gray in colour, and containing a small brown depression in its centre; lateral surface of egg and rounded edge steely gray. Base of egg more rounded than top, and its diameter somewhat less, as the straight sides converge slightly toward the base, giving to the whole a resemblance to an inverted truncate cone with rounded basal edge. Eggs laid in an exposed position upon the tree, and quite firmly cemented together; placed in a somewhat slanting position lengthwise of the twig, so that the edge of one is a little higher or lower than the adjacent edge of the next in the row.

Larva.—Emergence—When ready to emerge from the egg, the tiny larva makes its first meal upon the relatively thinner portion of the shell constituting the steely-gray area enclosed by the brown ring. Through the opening thus made in the top of the egg, the young larva gradually and laboriously works its way out. At this time the head is the largest segment, the body tapering very slightly from it to the tip of

the abdomen. The head and thorax are slowly worked up out of the shell until the legs can be of some assistance in pulling, after which the rest of the process is relatively easy and rapid. The length of time required to emerge after the central area of the shell has been completely removed varies from thirty minutes to one hour, after which the larva immediately starts off in search of food.

The larvæ were placed upon tender apple leaves, and commenced feeding at once. A slight jar caused many of them to spin down from the twig to the table, where they showed a decided tendency to travel toward the light.

Newly-hatched Larva (Plate 4, Fig. 2).—Length at rest, 1.5 mm.; width of head, .33 mm.; average diameter of body, .25 mm. Head large, rounded, nearly as wide as high, of a uniform yellow colour, darker than rest of body; clypeus triangular, marked by brown sutures; mandibles tipped with black. Head sparsely clothed with comparatively long, white hairs having blunt extremities; antennæ comparatively long; head free, erect. Body nearly cylindrical, tapering very slightly posteriorly from head; annulations not very distinct; segments somewhat shorter than their diameter; prolegs present on abdominal segments 7 and 10, with vestiges of a pair upon sixth abdominal segment. Cervical shield prominent, of same colour as head, and with a light yellow border, which is set with ten spines (Fig. 7 A). Arrangement of the tubercles, as

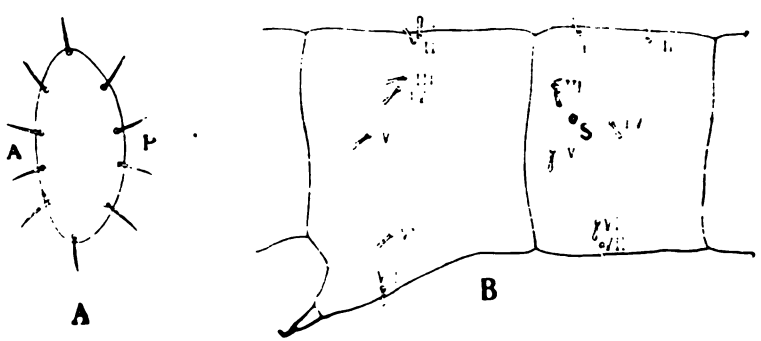


FIG. 7. Arrangement of tubercles and spines upon the larva of Anisopteryx pometaria, Harr., first instar. A: cervical shield on dorsum of prothorax; A, anterior side; P, posterior side. B: metathoracic and first abdominal segments; I, VII., tubercles and spines, according to Dyar's classification; S, spiracle.

shown in Fig. 7 B, differs upon the thorax from that prevailing upon the abdomen; tubercles on prothorax and 9th and 10th abdominal segments

not conforming to either arrangement. Upon meso- and metathorax, tubercle II. stands laterally close to tubercle I. upon the subdorsal line, and tubercles III. and IV. stand in similar relation upon the sublateral line; other tubercles upon these segments well separated and situated in nearly the same transverse line; upon the abdomen, with the exception of 9th and 10th segments, tubercles I. and II. stand longitudinally upon the subdorsal line, II. being slightly further from the dorsal line than I.; tubercles III., IV. and V. are separated, and form the apices of a triangle around the spiracle, which, upon the first abdominal segment, stands very near the centre of this triangle, but upon the other segments it stands in line with III. and IV., and midway between them; thus IV. is sub-postspiracular, while III. and V. are on the anterior third of the segment; tubercles VI. and VII. present.

Stripes much less distinct than in later stages; dorsal, lateral and stigmatal stripes brownish gray, apparently due to numerous evenly-scattered pigment spots in the epidermis; intermediate stripes (subdorsal, sublateral and substigmatal) pale yellow. Stripes irregular in outline, of different widths, dorsal stripe widest. Upon the abdomen tubercles I. and II. stand between the dorsal and subdorsal, III. in the sublateral, and IV. and V. in the substigmatal stripe; tubercles light brown in colour, each bearing a short, white, blunt spine. Stripes become indistinct during this instar, which lasts four days.

Second Instar.—During the two or three days following the first moult the average length of larvæ at rest increases to about 7 mm., while at the end of this instar the average is about 8 mm.

Segmentation now fairly distinct. Head rounded, colour mottled light and dark greenish; mandibles serrate, tipped with reddish brown; clypeal sutures distinctly marked; antennæ and palpi tipped with brown.

General colour of body light green, with six longitudinal white stripes alternating with dark green ones; dorsal stripe dark, broadest and darkest upon the cervical shield. Tubercles I. and II. stand in edge of dark dorsal stripe, III. in upper edge of dark stigmatal stripe; leg shields with a V-shaped dark marking.

General colour of under surface of abdomen light green. Pair of vestigial prolegs upon sixth abdominal segment more prominent than in first instar; each segment bearing no prolegs furnished with tubercles VI. and VII., as in previous instar.

Soon after hatching, the larvæ were divided into two lots, one of

which was kept under a bell jar, while the other was enclosed in a breeding cage. At the end of the second instar a marked difference was observed in the rapidity of development of the two lots. All the larvæ confined beneath the bell jar passed through the second ecdysis before one of those in the breeding cage had reached that point. The only observable difference in conditions was a greater abundance of moisture beneath the bell jar, which would naturally improve the food by keeping it fresh and tender. The second instar thus ranged from 5 to 7 days.

Third Instar.—The second ecdysis produced a marked change in colour in larvæ: the light green became dark green, and the light yellow stripes were much more conspicuous.

Two Days After Moult.—Average length at rest about 12 mm.; form as before. General colour varied from dark brownish-green to as light green as in previous instar; in light-coloured specimens, however, the broad dorsal stripe is much darker than the other stripes, and also darker than it was in the second instar.

Clypeus and labrum usually lighter coloured than rest of head; head somewhat mottled with green; antennæ at their bases as light coloured as labrum; mandibles yellow, tipped with black.

Spines and stripes present as in previous instars; substigmatal white stripe has become broader, and tubercles IV. and V. stand therein; spiracles conspicuous, dark brown.

The third moult took place in about six days after the second, and produced a great change in the appearance of the larvæ. It required less than forty-five minutes to get rid of the old skin after it began to rupture around the throat.

Fourth Instar.—Two Days After the Moult.—Length at rest about 18 mm.; form cylindrical, segmentation distinct. Head equal in size to any following segment, rounded, mottled brown and light green in colour, darkest on sides of lobes; clypeus triangular, extending nearly to head, its vertex connected by a light-coloured depression, with vertex of a white triangular area lying on top of head between the lobes; antennæ and labrum light coloured. The wide variation between light and dark specimens noticed in last instar has disappeared, so that the coloration has become quite uniform in different individuals; body marked with dark brown and white stripes; dorsal stripe broad and dull blackish in colour; subdorsal white stripe clearly defined, quite narrow; lateral stripe, which was dark in previous instars, has become changed almost

entirely to light geenish-white, with slight traces of the old dark stripe remaining along its edges; sublateral white stripe narrow and distinct; stigmatal stripe nearly black and irregular in width, being narrowed between segments and broadened around stigmata; substigmatal stripe white, below this there is still another dark stripe which is interrupted between the segments; anal plate light coloured and set with numerous spines. Tubercles and spines upon body as in previous stages, but less conspicuous on account of darker colour of body; each tubercle terminated by a shining black ring around base of spine borne thereon; each stigma marked by a shining black, oval border, enclosing white area in centre.

Venter light green; thoracic legs somewhat yellowish, claws brownish; prolegs concolorous with venter or with slightly yellowish tinge; prolegs upon fifth abdominal segment vestigial in all stages, crotchets upon them arranged around end of leg in the form of a horse-shoe opening outwardly (Fig. 4); of the eight or nine little crotchets on each vestigial proleg, the three posterior ones are largest; each proleg of the two functional pairs bears crotchets arranged in two groups of from 7 to 9 each at the extremities of a crescentic or semicircular pad borne upon inner side of tip of proleg, with its convex edge inward (Fig. 5). The crotchets vary in length alternately, thus forming two rows of hooks; along the convex edge of pad between the two groups are vestiges of from 8 to 14 more crotchets. (Plate 4, Fig. 6.)

Moulting.—As the larva approached a moult, it ceased to feed, became quiet for a time, which was longest before the third moult, lasting then for nearly two days, and when fully ready to shed its skin, firmly attached its prolegs, let go with its thoracic legs, and stood out at an angle to its support. Successive contractions now took place in various parts of the body, the thoracic legs were withdrawn and the skin stretched backward, after which the skin began to rupture on the ventral side of the throat, and through this transverse opening the under side of the prothorax appeared, the rupture continuing around the throat thus severed the old head-covering entirely from the rest of the integument. The thorax was soon freed, and by successive expansions and contractions of the body running backward with a wavelike motion the skin was drawn back over most of the abdominal segments. When about half the length of the body had been thus freed, the old head integument, which had in the meantime remained attached to the head over the mouth-parts,

was seized between the fore legs, pulled off and cast aside. As soon as the first pair of functional prolegs were free, they were moved forward and attached to the support, and by a gentle pull the rest of the body was quickly withdrawn. The tender larva then moved on a short distance and stopped to rest before proceeding to feed.

During the fourth instar the larvæ fed very heartily, becoming large and fat, but toward the end of the instar they became sluggish and fed but little. In from nine to twelve days they entered the ground to pupate. After two days, two of the larvæ were dug up and examined. They had formed little ellipsoidal cases of particles of earth held together by a loose silken lining, and apparently also by some mucilaginous substance. The cocoons were quite tough, slightly less than half an inch in length, and within them the larvæ were doubled up, as they were about half as long again as the cocoons, but after five days they had not pupated.

On May 28 it became necessary to discontinue the observations, so the large flowerpot containing the pupæ—pupating larvæ—was set in the ground in a sheltered place where it would receive a normal amount of moisture, so that its top stood even with the surface of the ground. A fine wire screen was placed over the pot to prevent the escape of the adults when they should emerge.

During September and October frequent observations were made to determine at just what time the adults emerged, but as none appeared, an examination was finally made. Twenty-five cocoons were found at depths ranging from 1½ to 4 inches, but the majority were not more than two inches deep. Each cocoon showed a small round hole through which some enemy had entered and destroyed the pupa. It is probable that the damage was done by small red ants (a species of Monomorium), as these were known to have destroyed other pupæ in the vicinity during the summer. The date of emergence of the adults could not, therefore, be determined, but this is a comparatively unimportant point, as it is well known that the majority of them emerge during the last part of October and the first of November.

EXPLANATION OF PLATE 4.

Fig. 1.—Small group of eggs of *Alsophila pometaria*, Peck., 5/1.

Fig. 2.—Newly-hatched larva, 26/1.

Fig. 3.—Top view of eggs, 42/1.

Fig. 4.—Tip of vestigial proleg showing crotchets, much enlarged.

Fig. 5.—Crotchets of functional proleg, highly magnified.

Fig. 6.—Crotchets of functional proleg arranged in two groups, with vestigial bases of crotchets between them.

FURTHER ABOUT THE TYPES OF ACRONYCTA.

BY HARRISON G. DYAR, WASHINGTON, D. C.

Prof. Smith's remarks in the May CANADIAN ENTOMOLOGIST contain two separate counts. He implies that I might be led by personal views to an improper treatment of the collection in my charge. This implication I indignantly repudiate, and leave Prof. Smith to explain his breach of etiquette as best he may. While Prof. Smith's lack of humour has led him to misunderstand my views, he has no right to imply that with any personal views whatever I would not properly conserve the National Collection. This collection, rapidly becoming the finest in the country, will continue to be conserved with the greatest care. As to the synonymy of the Acronyctas, Prof. Smith makes two assumptions. First, that the specimens now in the British Museum labeled as Guenée's types are still as labeled and described by him; second, that if so, they are properly types. As to the first assumption, I am not in a position at present to dispute it, though I think that some admixture or confusion might have easily arisen in transference, and considering the length of time that has passed. As to the second assumption, I regard it as debatable in the cases where Guenée described larvæ. In such cases, under the most favourable conditions, Guenée had before him Abbot's figure of a moth and larva and some specimens which Guenée himself thought to be the same species. Suppose in one of the cases under discussion that Guenée had before him Abbot's figure of the moth and larva of *subochrea* and also adult specimens of *afflicta*; that he regarded all as of one species and drew up a description under the name *hamamelis*. Now, if this description agrees with *subochrea*, and does not agree with *afflicta*, what is the type of Guenée's *hamamelis*? Clearly it is Abbot's drawing and not the specimens labeled by Guenée. Are we to be blindly led by a specimen labeled "type," which may be white, while the description is black? Is not what the author described and intended to count for something? I am a believer in types, and where they are certainly the specimens from which the author described, I would regard them as of high value. Walker's types are invaluable, and I never supposed that anyone would

think that I would seriously suggest their destruction. However, in Guenée's time the idea of types was not as fixed as now. Guenée saw no objection to describing a species from a figure. His descriptions of the larvæ of *hamamelis* and *brumosa* are clearly taken from figures, and why not those of the moths as well, since they correspond better with the species figured by Abbot than with the "types" as recently identified by Prof. Smith

Finally, let it be clearly understood that I speak for myself, and that the National Museum is in no way responsible for my remarks.

A NEW VARIETY OF LYCÆNA AMYNTULA, WITH OTHER NOTES.

BY FORDYCE GRINNELL, JR., PASADENA, CAL.

Lycæna amyntula, var. *Herrii*, n. var.— ♀ expanse, 1.25 in.; differs from typical *amyntula* by the replacement of the dark area of the primaries by a narrow black band about 1 mm. wide, and on the secondaries by only two red crescents instead of five as in typical *amyntula*. On the under side the markings are all much heavier.

♂ expanse, 1.00 in.; differs from ♂ of typical *amyntula* in having a black margin about 1 mm. wide, whereas there is none in typical *amyntula*, or, if any, a very slight trace. On the under side the markings are much more heavy. The male of this variety is also much smaller than the male of typical *amyntula*, and the tails seem more distinct in this variety.

Habitat: Cochise Co., Arizona.

Described from two males and two females in the collection of C. W. Herr and the writer, taken July, 1899, and September, 1900, by Mr. Poling.

Named in honour of Mr. C. W. Herr, my friend and fellow collector.

I have typical *amyntula* from San Francisco, Pasadena and Idlewild, San Diego Co., Calif.

Lycæna sonorensis.—Mr. Herr captured on March 14 a male of the above species. On the right side of the secondaries there is a slight trace of a red spot, and on the under side of the secondaries on the left wing there is another very conspicuous red spot, whereas there are no such spots in typical *sonorensis*.

Mr. Herr and myself have caught along the beach a species of *Pamphila* resembling *P. panoquinoides* in shape and general colour, but it has the row of spots on upper side of primaries as in *panoquin*, which puzzles us. *Panoquin* and *panoquinoides* are known only from the Atlantic coast and Florida, and the species here may possibly be new.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

(Continued from page 180.)

Ripersia, Sign.

Ripersia lasii, Ckll., 1896. (Native.) Originally described from ant-nests in Mass.; was found in an ants' nest (*Lasius Americanus*, Em.) at Toronto, Canada, in 1897, by Mr. R. J. Crew. It has been found infesting the roots of China asters in Mass.

Bib.—CAN. ENT., xxxi. (1899), 110.

Dactylopius, Costa.

Dactylopius longispinus, Targ. (Introduced.) The greenhouse Mealy bug, found throughout the civilized world, occurs in Canada in all the Provinces where greenhouse plants are grown; it is recorded from South Quebec.

Bib.—29th Annual Report, Ent. Soc., Ont., 1898, 43.

KERMESINÆ.

Kermes, Roitard.

Kermes Pettiti, Ehrh., 1899. (Native.) This scale was found at Jubilee Point, on Rice Lake, near Peterborough, Ontario, by Dr. Fletcher several years ago, on *Quercus rubra*. Up to 1899, the species was considered to be a form of *K. galliformis*, and was confused with that species up to that time. It is a very common species in the U. S., but seems to be rare in Canada.

Bib.—Psyche, ix. (1900), 81.

ORTHEZIINÆ.

Orthezia, Bosc.

Orthezia Americana, Walker, 1852. (Native.) Recorded from Grimsby, Ontario, on Golden-rod. Dr. Fletcher states that he has found it at Ottawa and in several other places.

Bib.—Rpt. U. S. Dep. Agr., 1880, p. 349; 32nd Ann. Rpt. Mass. Agr. Coll., 1895, p. 124.

ASTEROLECANIINÆ.

Asterolecanium, Targ.

Asterolecanium variolosum, Ratz., 1870. (Introduced.) Originally described as *Coccus variolosus*, and often cited as *Asterodiaspis quercicola*, *Asterolecanium quercicola*, *Asterodiaspis variolosus* and *Coccus quercicola*. I received this from by Dr. Fletcher, who found it last year on young oak trees at Ottawa, Canada, which were set out five or six years ago, and

came from a nursery in Pennsylvania. Judging from the appearance of the infested twigs sent, they must be quite destructive. It has also been destructive to oaks at Niagara Falls, Ontario. The species is common at Washington, D. C., and is found at New York, Conn., and Mass., also on oak. I have some from Germany, on oak, sent Prof. Cockerell. *Mytilaspis ulmi*, L., are on the same twigs.

LECANIINÆ.

Lecanium, Illig.

Lecanium hesperidum, L., 1758. (Introduced.) This occurs as a greenhouse species in Canada, in all the Provinces where greenhouse plants are grown. It is a very common pest in Europe and the U. S.

Lecanium pyri., Schr., 1781. (Introduced.) Found on apple on Prince Edward Island in 1894. It is not as yet a very common species. I have found it once in Mass. on pignut hickory.

Bib.—CAN. ENT., xxvi. (1894), 35.

Lecanium antennatum, Sign. var. (Native.) Recorded from Jubilee Point, Rice Lake, Ontario, on red oak, *Quercus rubra.*

Bib.—CAN. ENT., xxvii. (1895), 36.

Lecanium juglandis, Bouché. (Perhaps introduced.) This was received from Prof. Cockerell last year, marked on the label "on plum at Queenston, Ontario." There is a scale infesting the plum trees in New York, called *L. cerasifex*, Fitch. The one from Queenston is not that species.

Lecanium quercitronis, Fitch, 1856. (Native.) Found on *Quercus coccinea* at Ottawa, Canada. This is a common species throughout North America.

Bib.—CAN. ENT., xxv. (1893), 221.

Lecanium Fitchi, Sign., 1873. (Native.) Recorded from St. David's, Ontario, on Lawton blackberry. This seems to be a species not well defined, and will need further study when found on blackberry again.

Bib.—Insect Life, vii. (1894), 30.

Lecanium Fletcheri, Ckll., 1893. (Native.) Originally described from specimens found by Dr. Fletcher at Ottawa, abundant on a hedge of *Thuja occidentalis* and on trees of the same species at Stittsville, Ont., 15 miles from Ottawa. It was next found at New York by Mr. Pettit, and next by the present writer in 1898 on *Arbor vitæ*, at Lawrence, Mass. Last year, in February, I received some scales on *Thuja occidentalis* from Vienna, marked n. sp., which proved to be *L. Fletcheri*. It

was next found by me on August 13, 1900, at the Harvard botanical gardens, Cambridge, Mass., on *Thuja occidentalis* var. The lot described from, by Prof. Cockerell, were parasited by a *Chalcidid.* Those which Dr. Fletcher sent me were also parasitized.

For a record of the excessive abundance of parasites of this species, see L. O. Howard, Bull. VII., N. S., Div. Ent. U. S. Dep. Agr., 1897, p. 62–63.

Bib.—CAN. ENT., xxv. (1893), 221; 29th Ann. Rpt. Ent. Soc., Ontario (1898), 88; CAN. ENT., xxxii. (1899), 141; Psyche, viii. (1899), 349; Psyche, ix. (1901), 154.

Lecanium Canadense, Ckll., 1895. (Native.) Originally described from Stittsville, Ont., about 15 miles from Ottawa, on *Ulmus racemosa;* received also from Nappan, Nova Scotia, on *Ulmus Americana.* The scales from Stittsville were affected by a *Coccinellid (Scymnus punctatus)* and an *Encyrtid* parasite. This species has proved a serious enemy of *Ulmus Americana* at Ottawa. Dr. Fletcher has received specimens also from Brandon, Man. The scale has since been found in Maine and Mass. The species was described as *L. caryæ*, var. *Canadense*, but by further study in 1898, Prof. Cockerell decided that it was a distinct species.

Bib.—CAN. ENT., xxvii. (1895), 253; xxx. (1898), 294; The Industrialist, April, 1899, p. 232.

Lecanium pseudhesperidum, Ckll., 1895. (Nativity unknown.) Described from specimens found in a greenhouse at Ottawa, Canada, Dec. 15, 1894, on a *Cattleya. Aulacaspis Boisduvalii* was found on the same plant.

Bib.—American Naturalist, April 1st, 1895, p. 381.

Lecanium maclurarum, Ckll., 1898. (Native.) Described from material collected near Niagara, Ontario; rather abundant on twigs of Osage orange, June 17, 1898.

Bib.—CAN. ENT., xxx. (1898), 294; The Industrialist, April, 1899, 236.

Lecanium caryarum, Ckll., 1898. (Native.) Described from specimens found on *Carya alba*, at Niagara, Ontario, June 17, 1898, and said to be very abundant.

Bib.—CAN. ENT., xxx. (1898), 293; The Industrialist, April, 1899, p. 233.

Lecanium nigrofasciatum, Perg., 1898. (Native.) The Peach

Lecanium is found in Western Ontario, on *Acer saccharinum*. Just recently Dr. Fletcher sent me specimens on white maple (*A. dasycarpum*) from St. Catharines, Ontario. Although this is called the Peach Lecanium, it is by no means confined to peach trees, as it is found on various species of maple, plum, apple, *Cratægus*, sycamore, *Brumelia*, linden, olive and *Vaccinium*.

Bib.—Bull. No. 18, U. S. Dep. Agr., Div. Entom. (1898), p. 27; CAN. ENT., xxi. (1899), 141.

Lecanium cerasifex, Fitch, 1856. (Native.) Said to have been found on plum at Queenston, Ontario, in 1894. and since that in many places in the fruit district extending from Niagara to Burlington, Ont.

Bib.—Rpt. Exp. Farm, 1895, p. 157; Trans. Royal Soc. Can., 1899–1900, p. 219.

Lecanium pruinosum, Coql., 1891. (Native) This was found on peach at Niagara, Ontario. Received from Prof. Cockerell last year, sent to him by Dr. Fletcher.

Lecanium Websteri, Ckll. and King, 1901. (Native.) On black and red currant in Nova Scotia and at Ottawa, Canada. The species was for a long time supposed to be Fitch's *L. ribis*. It seems to be quite a general feeder, as will be seen when reference is made to the literature.

Bib.—CAN. ENT., xxxiii. (1901), 108.

Lecanium carya, Fitch, 1856. (Native.) This was found sparingly on peach at Niagara, Ontario, by Dr. Fletcher in 1898, and since that has been occasionally found by Mr. George E. Fisher on the same tree; but never in abundance. It is the largest species of the subgenus *Eulecanium* found in North America. All that is known of the species will be found in the literature cited below.

Bib.—Entomological News, xii. (1901), 50–1.

Lecanium. Species probably new; not sufficient for study; was received with the above species; also found at Niagara, Ontario, on peach.

Lecanium armeniacum, Craw,* 1892. (Native.) The apricot scale was found infesting orchards at Sherbrooke, Quebec, in 1899; it is common in California.

Bib.—Ann. Rpt. Exp. Farms, 1899, p. 160.

Lecanium cynosbati, Fitch, 1856. (Native.) Was received from Mr. John Dearness in 1900; found at London, Ontario, on honey locust. Dr. Fletcher states that he found this species abundant on honey-locust trees in the streets of Dundas, Ont., in 1898.

Pulvinaria, Targ.

Pulvinaria innumerabilis, Rathv., 1854. (Native.) The cottony maple scale. A common North American species. Recorded from grapevines and maple at London and other places in Western Ontario.

Bib.—15th Ann. Rpt. Ent. Soc., Ontario, 1884, p. 27; 29th ibid, 1898, p. 91.

Pulvinaria brassiæ, Ckll., 1895. (Nativity unknown.) Now considered identical with *P. floccifera*, Westw. Was found in a greenhouse at Ottawa, Canada, Dec. 15, 1894, on leaves of *Brassia verrucosa*. The plant is a native of Mexico, and was purchased from a New Jersey florist.

Bib.—CAN. ENT., xxvii. (1895), 135.

Pulvinaria occidentalis, Ckll., 1897. (Nativity uncertain.) Found infesting in a serious manner a whole plantation of red and white currant at Chilliwack, British Columbia, by Rev. G. W. Taylor, in the spring of 1899. In July (the same year) Dr. Fletcher visited the plantation and found these scales to be in enormous numbers, the white flocculent threads giving the bushes the same appearance as if a light fall of snow were upon them. It may turn out, however, that when we can get some of the European species of *P. ribesiæ* to compare with it, it may prove to be that species.

Bib.—Ann. Rpt. Exp. Farms, 1899, p. 203.

Eriopeltis, Sign.

Eriopeltis festucæ, Fonse, 1834. (Introduced.) The cottony grass scale. This was found by Mr. A. H. McKay, on grass, in large numbers in Cumberland Co., Nova Scotia, in 1889. It was cited as a new species of Rhizococcus, and is said to occur in Dakota, Indiana and Illinois, on timothy and red-top grass. It is parasited by a Dipteron, *Leucopis bellula*. It has occurred, in conspicuous numbers, several times in Nova Scotia and New Brunswick of late years.

Bib.—Insect Life, i. (1889), 385; ib. ii. (1890), 326; Report Exp. Farm, 1895, p. 145; Trans. Royal Soc., Canada, 1899–1900, p. 216.

DIASPINÆ.

Aspidiotus, Bouché.

Aspidiotus hederæ, Vall., 1829. (Introduced.) It is reported from British Columbia, and will be found in all the Provinces where greenhouse plants are grown. It is a common species on palms, *Cycas revoluta*, olive, ivy, etc. I have also received it on palm found in a house at London, Ontario, by Mr. John Dearness.

Aspidiotus Forbesi, Johnson, 1896. (Native.) The Forbes scale. This has been received from Mr. John Dearness, on beech *(Fagus Americana)*, November, 1900, at London, Ontario; also on hawthorn, plum and apple in many parts of Ontario. It is recorded from Ottawa on fragrant currant (Ribes).

Bib.—28 Ann. Rpt. Entom. Soc. Ont., 1897, p. 80.
29 " " " 1898, p. 86–88.
30 " " " 1899, p. 109.
Exp. Farm. Rpt., 1898, p. 205.
Trans. Royal Soc. of Can., 1899–1900, p. 219.

Aspidiotus ancylus, Putn., 1877. (Native.) The Putnam scale. It is recorded from Ottawa, on elm. I received it from Dr. Fletcher, April 10, 1900, on willow from Toronto, and just recently on plum from St. Catharines.

Bib.—28 Ann. Rpt. Ent. Soc. Ont., 1897, p. 80.
29 " " " 1898, p. 86 and 88.
30 " " " 1899, p. 109.
Exp. Farm Rpt., 1898, p. 205.
Trans. Roy. Soc. Can., 1899–1900, p. 219.

Aspidiotus ostreæformis, Curtis, 1843. (Introduced.) The European orchard scale. Reported from Chilliwack, British Columbia. Is now received from Western Ontario and from St. Catharines, Ontario, on maple *(Acer dasycarpum)*, sent by Dr. Fletcher, and found by Mr. George E. Fisher, April, 1901.

Bib.—Yearbook U. S. Dept. Agr., 1899, p. 746.
Trans. Roy. Soc. Can., 1899–1900, p. 219.
30 Ann. Rpt. Entom. Soc. Ont., 1899, p. 67 and 109.

Aspidiotus perniciosus, Comst., 1881. (Introduced.) The pernicious scale. This was first found near Kelowna, on Lake Okanagan, British Columbia, in 1894, and in 1897 it was reported as found in the Provinces of British Columbia and Ontario. The first lot received by the Government Entomologist was from an Ontario orchard near Chatham, in Kent Co., January, 1897, and soon after from Niagara and St. Catharines, and Kingsville in Essex Co. It has since been found on Vancouver Island (where it has been entirely eradicated); also at Guilds, south of Blenheim, Harwich, Belleville, London East, Chatham, Guelph, Winona, Burlington, Essex Centre and St. Thomas, Ont. Mr. John Dearness found a mite attacking this insect,

received from Mr. J. Gordon at Guilds, Kent Co., Ont., in 1899. Identified as *Tyroglyphus malus*. There is also a moniliform fungus found on specimens from plum.

Bib.—Farmer's Advocate, London, Ont., 1894.
CAN. ENTOM., Vol. 26, 1894, p. 355.
Entom. News, Vol. 9, 1898, p. 96.
28 Ann. Rept. Ent. Soc. Ont., 1897, p. 78.
29 " " " " 1898, p. 86.
30 " " " " 1899, p. 3.
31 " " " " 1900, p. 79–87.
Evid. of Dr. Fletcher before the House of Com., 1898, p. 1–12.
" " " " " 1899, p. 4–6.
" " " " " 1900, p. 1–7.
Trans. Roy. Soc. Can., 1899–1900, p. 218.
Ann. Rept. Exp. Farm, 1898, p. 204.

Aspidiotus (Targionia) Dearnessi, Ckll., 1898. This was found by Mr. John Dearness, August 20, 1898, on twigs of *Arctostaphylos uva-ursi*, in the Ojibway Indian Reserve in Saugeen, in the Bruce Peninsula, on the sandy shore of a little bay of Lake Huron.

Bib.—CANADIAN ENTOMOLOGIST, Vol. 30, 1898, p. 266.

Aspidiotus diffinis, Newst., 1893. (Prob. introduced.) This is found in the woods on basswood *(Tilia americana)*. I have received examples from Mr. Dearness, found in the woods at several places in Western Ontario, 1900, and am of the opinion that it may yet be proved to be a variety of *diffinis*.

Bib.—Entomological News, xi. (1900), p. 425.

Chrysomphalus, Ashm.

Chrysomphalus dictyospermi, Morg., 1889. (Introduced.) Dr. Fletcher sent this to me on leaves of cinnamon found in a greenhouse at Ottawa, April, 1900. It is found in hothouses in the United States.

Aulacaspis, Ckll.

Aulacaspis Boisduvalii, Sign., 1869. (Introduced.) Found in a greenhouse at Ottawa, Canada, on *Cattleya*, Dec. 15, 1894.

Bib.—American Naturalist, 1895, p. 381.

Aulacaspis rosæ, Bouché, 1833. (Introduced.) Often cited as *Diaspis rosæ*. This was received from Dr. Fletcher, January of this year. Found at Vancouver, British Columbia, out of doors, on rose bushes; also from Niagara, Ont., on outdoor roses.

Chionaspis, Sign.

Chionaspis pinifoliæ, Fitch, 1855. (Native.) A common species in North America. Recorded from Toronto, Ottawa, etc., Ontario, and found in British Columbia, in 1897, on *Abies grandis*. In Quebec Province found very abundantly on *Picea alba*, at Metis, Que., by Dr. B. J. Harrington (Fletcher).

Bib.—Spec. Bull. Mass. Agr. Coll., August 10, 1899, p. 22.

Chionaspis Lintneri, Comst., 1883. (Native.) Apparently quite common on wild alder *(Alnus incana)* and birch *(Betula papyrifera)*, at St. John, New Brunswick; Charlottetown, and many other places in Prince Edward Island; Chateauguay, P. Q., and Ottawa, Ont.

Bib.—Can. Ent., Vol. 27, 1895, p. 33.
" " " 30, 1898, p. 85.
Spec. Bull. Mass. Agr. Coll., 1899, p. 28.

Chionaspis furfurus, Fitch, 1856. (Native.) The scurfy bark-louse. This is another common scale found on apple. It is recorded from Leamington, Ontario; Nova Scotia, New Brunswick, and Prince Edward Island. Mr. Dearness sent it to me on hawthorn in 1898.

Bib.—28 Ann. Rpt. Ent. Soc. Ont., 1897, p. 16.
29 " " " 1898, p. 86.
30 " " " 1899, p. 68.
Can. Ent., Vol. 26, 1894, p. 354.
Spec. Bull. Mass. Agr. Coll., 1899, p. 28.
Psyche, Vol. 8, 1899, p. 336.

Chionaspis salicis-nigræ, Walsh, 1867. (Native.) Recorded from Leamington, Kingsville and Kingston, Ontario.

Bib.—Spec. Bull. Mass. Agr. Coll., 1899, p. 20.

Hemichionaspis, Ckll.

Hemichionaspis aspidistræ, Sign., 1869. (Introduced.) Originally described as a *Chionaspis*. I received this from Dr. Fletcher, on a fern *(Pteris serrulata)* found in a greenhouse at Ottawa, Canada, December 16, 1900. It is found in California, Washington, D. C., and Mass.

Mytilaspis, Sign.

Mytilaspis ulmi, L., 1758. (Introduced.) The oyster-shell bark-louse of the apple, heretofore recorded as *Mytilaspis pomorum*, Bouché. It is well established throughout Canada, and recorded from Ottawa on red and black currant, lilac, Spiræa, ash, dogwood, mountain ash, and hawthorn. I have it from Mr. John Dearness, found at London, Ontario, 1900, on apple. *Aspidiotus perniciosus*, Comst., are on the same twigs.

Bib.—Can. Ent., Vol. 26, 1894, p. 354.
Exp. Farm Rpt., 1898, p. 205.
Evid. of Dr. Fletcher before the Com. of House of Comm., 1898, p. 18; ibid, 1900, p. 12.
28 Ann. Rept. Ent. Soc. Ont., 1897, p. 16.
29 " " " " 1898, p. 88.
30 " " " " 1899, p. 12 and 67.

THE XIPHIDIINI OF THE PACIFIC COAST.

BY A. P. MORSE, WELLESLEY, MASS.

In the summer of 1897 I devoted several weeks to a rapid Orthopterological reconnaissance of the Pacific Coast, collecting material at various points from Yuma to Victoria, B. C., and the following paper is based upon the specimens secured at that time. At the request of Mr. Scudder, to whose collection and mine the types belong, I have studied the material, with the results given below.

So far as I am aware, no species of this group has hitherto been recorded from west of the Rocky Mountains, although it is exceedingly improbable that specimens are not to be found in entomological collections from that region. In the following paper, four well-defined species are noted, one of them extending entirely across the continent. Two others are of especial interest, from the great variation presented by them according to locality, and students of the group will do well to collect material in considerable series.

Orchelimum agile, DeGeer.

One ♀, Sisson, Calif., Sept. 3. Identical with New England examples; taken among the grasses and sedges of a springy meadow.

Xiphidium spinosum, sp. nov.

Fastigium of vertex of moderate width, rather more than one-third of the width between the eyes, the sides divergent when viewed from in front. Pronotum with the hind margin convex, the lateral lobes as deep as long, their posterior margin nearly straight, a distinct sinus at the shoulder. Tegmina narrow at tip, passing the hind femora 1 to 2 mm. and exceeded by the wings by about the same amount. Fore tibiæ with 5 or 6 pairs of spines. Hind femora bearing on the under side from 2 to 5 (usually 4) strong black spines, the genicular lobes distinctly bispinose. Subgenital plate of the male truncate, the cerci of moderate length, straight, bearing the usual inwardly-directed tooth at the basal third, the distal two-thirds broad, with subparallel sides, the apex blunt and strongly depressed from above.

Testaceous, with a dark median band on top of head and pronotum, reaching tip of the fastigium. Antennæ rather short, brownish fuscous. Femoral and tibial spines black, or nearly so.

Antenna: 35–40. Pronotum: 3. Ovipositor: 7–8. Cerci of ♂: 1.5–2. Body: ♂, ♀, 13-14. Post. fem.: ♂, 10.5–11.5; ♀, 11.5–12. Teg.: ♂, 13.3–15; ♀, 15–16 mm.

Three ♂, 2 ♀, 1 immature ♀, Coronado, Calif., July 24, on salt-marsh; collected by A. P. Morse.

Xiphidium occidentale, sp. nov.

Fastigium of vertex very broad, at least one-half as wide as the distance between the eyes, blunt, convexly rounded in front; viewed from before, as wide as deep, the sides very strongly divergent. Lateral lobes of the pronotum usually longer than deep, the hind margin straight or nearly so, passing into the hind margin of the posterior process with but a slight sinuosity. Dorsum of the pronotum with the front and hind margins truncate or slightly convex, the front margin sometimes slightly excavate. Tegmina of the male covering two-thirds or three-fourths of the abdomen, rarely all but the cerci, of moderate width, rounded at the apex; those of the female covering about one-half of the abdomen, in var. *camurum* reaching apex of the hind femora, the distal portion wide, with well-rounded apex. Wings equalling tegmina except in *camurum*, in which they exceed them about 2 mm. Spines of the fore tibiæ 5 or 6 pairs. The hind femora unspined, the genicular lobes pointed, scarcely spinose.

Cerci of the male long, stout, the apex regularly tapering, acuminate and very slightly depressed at tip, the lateral outlines slightly sinuous, the usual stout, inwardly-directed tooth present near the base. Ovipositor of the female two-thirds to seven-eighths as long as the hind femora, slightly curved upward in both margins, tapering very gradually to the slender tip.

Brown above, with brown or green sides, and usually with a broad dark-brown median band on head and pronotum (often also on exposed portion of abdomen of female), bordered on each side by a pale yellowish stripe; the dorsum of abdomen of young with a broad fuscous band.

Antenna: ♂, 19–37; ♀, 27–35. Pronotum: ♂, ♀, 3.5–4. Teg.: ♂, 6–8.5; ♀, 4–7. Body: ♂, 10–15.5; ♀, 13–15. Post. fem.: ♂, 9.5–14; ♀, 10–15. Ovip.: 8–13, usually 9–10 mm.

68 ♂, 59 ♀, 3 young. Aug. 3 to Sept. 4, at Tehachapi, Ahwanee, Wawona, Yosemite Valley, Berkeley, Sisson, Gazelle, Calif.; Sept. 7 to 15, at Ashland, Grant's Pass, Roseburg, and Corvallis, Or.; collected by A. P. Morse; also 1 ♂, 1 ♀, Sisson, Calif., in cab. S. H. Scudder.

X. occidentale camurum, var. nov.

1 ♀, Ashland, Or., Sept. 7, taken by A. P. Morse. This specimen is apparently a long-winged form of the species here described, differing from it only in the complete development of the tegmina and wings, the former

being 16 mm. long, and the latter passing them 2 mm., exceeding the end of the hind femora 1.5 mm.

X. occidentale caudatum, var. nov.

1 ♂, 2 ♀, Mt. Shasta district, July, Hy. Edwds., No. 165 (cab. S. H. Scudder). In these specimens the ovipositor of the females is exceptionally long, even relatively to the hind femora, the usual proportions of the two being reversed, thus: Post. fem., 10–10.5; ovip., 13.5–14.5 mm. Nevertheless, in the absence of other evidence, I am disposed to regard them as belonging to this species.

In this connection it is of interest to note that specimens from the Mt. Shasta region (Sisson, Gazelle), not only of this species, but of the following *(vicinum)*, have the ovipositor of exceptional length, as the accompanying measurements will show:

	Roseburg and Grant's Pass.		Berkeley.	Ahwanee.	Wawona.		Yosemite Val.	
P. fem...	14	13.5	12.3	12	13.6	12.5	15	14
Ovip....	9	9.5	8	8.3	10	10.3	12	13

Gazelle.		Sisson.				var. *caudatum*.	
13	11.5	11.7	11.5	10.5	10	10	10.5
11.5	10	9.5	10	9	9	13.5	14.5

Compare also the relative proportions of the specimens from Roseburg and Grant's Pass with those of the Yosemite Valley.

Xiphidium vicinum, sp. nov.

Very similar in colour, size and structure to *X. fasciatum* of the east, but with the ovipositor almost constantly longer, both actually and in proportion to the hind femora, in long-winged females reaching the end of the wings; wings and tegmina dimorphic, in long-winged examples passing the apex of the hind femora 4–6 mm.; in general, however, falling short of their tip by 2–3 mm. The male often indistinguishable from *fasciatum*, but with cerci showing a tendency toward greater breadth across the basal part of the apical portion (just distad of the tooth), and a less sinuous externo-lateral margin.

In a considerable series of *fasciatum* before me, the ovipositor ranges in length from 50 to 69 % of the length of the hind femora. In *vicinum* the range is from 67 to 95 %, and the actual measurements are as follows:

Ovip.	H. fem.	Ovip.	H. fem.
7	9.3	10	11.4–12.5
8	9.3–12	11	12–14
9.5	10–11	13	13.7–14.5

In general, specimens from the south are larger, and have the ovipositor actually and proportionally longer than those from the north or the coast, but, as noted above under *occidentale*, those from the Shasta region have relatively long ovipositors.

This variation in size and proportions is very noticeable when material is arranged in series according to locality, in the examples before me there being less range of variation from the same locality than in specimens of *fasciatum* from New England. Owing to this and to the difference between the southern and the coastwise and northern examples, there appears to be a tendency toward the formation of local races. Some idea of these differences may be gained from the following measurements of the hind femora and ovipositor of the material from various localities:

	West Berkeley.	Mill Valley.	Tenino.	Divide.	Drain.
H. fem..	10.5–12	9.5	11.5–12	11–12.3	9.3–10.7
Ovip ...	8–9	8	8–9	7.5–8.5	7.5–8

	Gazelle.	Sisson.	San Bernardino.	Colton.	Palm Springs.
H. fem..	9.3	10.6–11.5	13.3–14	12–14.5	11.3–14
Ovip....	8	9–9.7	11–13	10–13	10–13

The long-winged examples consist of 6 ♂, 5 ♀, from Palm Springs, San Bernardino, Colton and Kern City, in California, and of 4 ♂ from Ashland and Glendale, Or.; in two of the latter, however, the wings exceed the hind femora but little. For this form, especially as found in the south, I propose the name *productum*. It resembles *fasciatum* from the south-eastern States very closely except for the much longer ovipositor.

61 ♂, 59 ♀, California, from July 10 to Sept. 4, at Palm Springs, San Bernardino, Colton, Los Angeles, Kern City, Lathrop, West Berkeley, Mill Valley, Sisson, and Gazelle; Oregon, from Sept. 7 to 12, at Ashland, Glendale, Drain, and Divide; Washington, Sept. 24, at Tenino; in grass and sedge along streams; collected by A. P. Morse.

KEY TO SPECIES.

Stouter species; ovipositor of female strongly curved, stout; subgenital plate of male triangularly excavate *Orchelimum agile.*

Slenderer species; ovipositor of female slender, straight or but little up curved; subgenital plate of male truncate.

Hind femora spinose on under side..... *Xiphidium spinosum.*

Hind femora unspined.

Vertex very broad and blunt, one-half as wide or wider than the distance between the eyes; tegmina and wings usually abbreviated; cerci of male long, acuminate at tip. *Xiphidium occidentale.*

Vertex less than half as wide as distance between eyes; tegmina and wings variable, but covering whole of abdomen or more; cerci of male short, strongly depressed at tip.. *Xiphidium vicinum.*

MORE ABOUT THE RED-WINGED CATOCALÆ.

BY G. H. FRENCH, CARBONDALE, ILL.

At the time of writing my article* on the "Red Wing" species of Catocalæ I was in doubt about a few forms, as there were some I had not seen. Since writing that, Mr. O. C. Poling, of Quincy, Ill., kindly sent me for examination some of these, and many others from his large collection; besides enriching my cabinet with several species it did not before contain. To bring the "Red Wings" into what seems to be their proper relationship my last article needs a revision, which I will here make before taking up the "Yellow Wing" forms.

Marmorata should probably precede *Concumbens*, where it may be found in this series. Mr. Poling's new species, *Frenchii*, should follow *Californica* and its varieties. Mr. Henry Edwards described both *Jessica* and *Portia* as related to *Californica*. These, with Mr. Poling's species, *Hippolyta* and *Luciana*, it seems to me should constitute what might be called the *Californica* group.

Next I would place the *Junctura* group, from 32 to 38. This group has been a puzzle to all students of the genus from the time Mr. Grote began working on it to the present. From a careful study of Mr. Poling's large series, what my own cabinet contains, and some from the cabinet of Supt. A. J. Snyder, of Belvidere, Ill., I believe I have identified the forms so far as names are concerned. As to their value as species, that can not be decided definitely without breeding, nor can breeding decide the question unless we know what forms a brood make after they are bred. I have bred one of these, *Stretchii*, and have in my series a good representation of its variations. I would place *Cassandra* just before this, a species that is also somewhat variable. I have taken *Walshii* here for more than twenty years, and Walker's description of *Junctura* does not fit any specimen I have ever taken. It seems to me

* CAN. ENT., XXXIII., 12 (Jan., 1901).

to be as much entitled to specific rank as any of the group. *Aspasia* is a Colorado form that extends very little outside that State. *Babayaga* and *Arizonæ* are both to be found in Arizona. The general tone of the first is reddish gray, that of the second bluish gray. A specimen before me from Texas differs from all the others in the group in having a greenish tint and in being larger than the others. Mr. Dodge, of Louisiana, Mo., has another specimen from the same locality that is like this. It may be that when more material is obtained of this and of *Arizonæ* they may be sufficiently distinct to merit a name.

Circe is another species of which some doubt has been felt. For this reason I placed it as a variety of *Coccinata* in my former article. I have occasionally taken the form here, and have seen it in other cabinets, and it has always been *Circe*, without any variation toward *Coccinata*. The late Henry Edwards expressed the opinion that it was a valid species. I will here follow what has been my own conviction as to the form, and place it in the list as a distinct species. Beginning with *Cara*, I would group the species as follows :

22. Cara, Guenée.
 var. Sylvia, Hy. Edw.
 var. Carissima, Hulst.
23. Amatrix, Hubner.
 var. Nurus, Walker.
24. Marmorata, Edw.
25. Concumbens, Walker.
 var. Diana, Hy. Edw.
 var. Hillii, Grote.
26. Californica, Edw.
 var. Perdita, Hy. Edw.
 var. Cleopatra, Hy. Edw.
27. Frenchii, Poling.
28. Jessica, Hy. Edw.
29. Hippolyta, Hy. Edw.
30. Portia, Hy. Edw.
31. Luciana, Hy. Edw.
 Nebraskæ, Dodge.
 var. Somnus, Dodge.
32. Babayaga, Strecker.
33. Arizonæ, Grote.
34. Aspasia, Strecker.
 var. Sara, French.
35. Walshii, Edw.
36. Junctura, Walker.
37. Cassandra, Hy. Edw.
38. Stretchii, Behr.
39. Augusta, Hy. Edw.
40. Rosalinda, Hy. Edw.
41. Pura, Hulst.
42. Semirelicta, Grote.
43. Unijuga, Walker.
44. Beaniana, Grote.
45. Meskei, Grote.
46. Mariana, Hy. Edw.
 var. Francesca, Hy. Edw.
47. Grotiana, Bailey.
48. Hermia, Hy. Edw.
49. Briseis, Edw.
50. Faustina, Strecker.
 var. Zillah, Strecker.
 var. Verecunda, Hulst.

var. Allusa, Hulst.
51. Irene, Behr.
var. Virgilia, Hy. Edw.
var. Volumnia, Hy. Edw.
var. Veleria, Hy. Edw.
52. Parta, Guenée.
var. Perplexa, Strecker.
var. Petulans, Hulst.
53. Coccinata, Grote.
var. Sinuosa, Grote.
54. Circe, Strecker.
55. Aholibah, Strecker.
56. Chiricahua, Poling.
57. Violenta, Hy. Edw.
58. Verilliana, Grote.
var. Ophelia, Hy. Edw.
var. Votiva, Hulst.
59. Ultronia, Hubner.
var. Celia, Hy. Edw.
var. Mopsa, Hy. Edw.
var. Adriana, Hy. Edw.
var. Herodias, Strecker.
60. Ilia, Cramer.
var. Zoe, Behr.
var. Uxor, Guenée.
var. Osculata, Hulst.
61. Innubens, Guenée.
var. Flavidalis, Grote.
var. Hinda, French.
var. Scintillans, Grote.

ON LABELING INSECTS.

There is a great lack of uniformity in labeling insects; owing to which it is often impossible to distinguish the name of the locality from that of the collector; and with reference to the date of capture, it is impossible to discover what is meant (when the day of capture is less than the 13th), on account of some collectors placing the day of the month first, and others the month.

For instance, a specimen taken on May 10, 1901, would by some be labeled 10, 5, 1901, and by others (chiefly amongst Americans) 5, 10, 1901. On passing from one collection to another, the recipient would be undecided as to whether the figures referred to May 10 or Oct. 5.

Again, now that exchange abroad is much more common than formerly, it is insufficient to give simply the village or wood in which the insect is taken.

The province or county should also be given, in full if possible, unless the name of the country be also added, when both the latter may be abbreviated; as for example: "Bradford, Yorks., Eng.," or "Shovel Mount, Burnet Co., Tex."

It must be remembered that there are counties of Middlesex, Surrey and Cornwall in Jamaica; that there are similar instances everywhere, and hosts of towns with well-known English names in the United States, in Canada and other colonies; so that specimens so ambiguously labeled

as "London," "Victoria," etc., might give rise to much confusion in general collections.

I have the honour, therefore, to propose the following system of labeling all insects :

1st. The exact locality is to be given in full, invariably including county (or province) also, such as "Bognor, Sussex," "Admont, Styria," "Palm Beach, Florida"; or if the county's name be abbreviated, the country also to be added, as "Bradford, Yorks., Eng."

2nd. The date to be invariably given in the following order: Day, month, year; and to further avoid misunderstanding, the month to be given in Roman numerals, thus: May 10, 1901, should read 10, v, 1901.

3rd. The collector's name (if added) to be always placed sideways to the rest of the inscription, and the ticket to be attached to the insect so that it may be read from the right-hand side of the specimen.

Examples :

BRUNETTI.	New Forest, Hants, Eng. 16, vi, 1901.

CROSBY.	Lake Keuka, New York, 14, viii, 1901.

The scientific value of collections thus uniformly labeled would, I think, be increased, and reference, at least, much facilitated.

E. BRUNETTI, London, England.

BRITISH MUSEUM COLLECTIONS.

The national collection of Lepidoptera located in the National History Museum at South Kensington has recently been greatly enriched by the addition thereto of the almost unique collection of butterflies from Europe and Central and Eastern Asia, together with the collection of European moths, formed by the late Mr. John Henry Leech, of Hurdcott House, Salisbury. Arrangements had been made during Mr. Leech's lifetime, under which the Museum became possessed of his Eastern Asian moths, and now the same public institution has acquired the still more important accessions adverted to, through the munificence of his mother, Mrs. Leech, of Kensington Palace-gardens. Of Rhopalocera there are rather more than 18,000 specimens. This collection of Palæarctic butterflies is very rich in Chinese and Japanese species, and in local forms and aberrations of European species. The European Heterocera number about 23,000 specimens.—*Daily Telegraph*, London, England.

NEW COCCIDÆ FROM NEW MEXICO.

BY T. D. A. COCKERELL.

Orthezia lasiorum, n. sp.— ♀. About 2 millim. long; *pale orange;* ovisac (in specimens seen) not very long; *two very long median white caudal lamellæ*, about two-thirds length of body, curving over ovisac, but not attached to it. Dorsum covered with waxy secretion, but it is so easily deciduous that I have never found an adult with it sufficiently in place to describe. Middle leg with femur + trochanter 300 μ, tibia 240, tarsus (without claw) 180. Antennæ 7-jointed, the last joint with a terminal spine; joints measuring in μ: (1.)75–90. (2.)72–75. (3.)84–95. (4.)60. (5.)48. (6.)45. (7.)120–129. I have never found one with 8 joints, though I should expect such to occur.

Young.—Length of body about 1 millim.; body yellowish-pink, thickly covered with waxy lamellæ, no bare areas; long caudal lamellæ; antennæ and legs black or almost. There is a groove down the middle of the back, with no triangular plates (such as occur in *O. occidentalis*); the anterior lateral lamellæ are about 1½ as long as broad, the posterior ones about 2½ as long as broad. The caudal lamellæ make a very conspicuous tail.

Hab.—Abundant in nests of *Lasius Americanus*, Las Vegas and Trout Springs, N. M. Easily known by the orange colour and long tail. *O. occidentalis* also occurs at Trout Springs; its secretion is hard to remove, not at all easily brushed off as in *lasiorum*. Although *O. lasiorum* is so abundant, I have never seen it except in nests of *Lasius*. The ♀ with ovisac was first found by my wife, April 25.

Dactylopius Neomexicanus, var. *indecisus*, n. var.— ♀. 1⅔ millim. long. Pink, varying to pale sage green; mealy; no lateral or caudal tufts; no well-defined ovisac; legs and antennæ very pale. Middle leg, with femur and trochanter, 174 μ; tibia 108; tarsus (without claw) 60. Antennæ 8-jointed, varying to 7; one ♀ full of eggs had one antenna with 8 joints, the other with 7. Formulæ: 812(37)(56)4 and 821(37)6(45). Measurements of joints in μ: (1.)36–45. (2.)36–40. (3.)24–25. (4.)15. (5.)15–18. (6.)18–21. (7.)24. (8.)63-69. Seven-jointed form: (1.)45. (2.)45. (3.)30. (4.)36. (5)24. (6.)27. (7.)63.

Hab.—In nests of *Lasius Americanus*, Las Vegas, N. M., April 22 *(W. P. Cockerell)*. I thought this might be merely a summer form of *D. Neomexicanus*, but the types of the latter, with very different ovisacs, were collected in summer.

Eriococcus Tinsleyi, var. *cryptus*, n. var.— ♀. When boiled in potash becomes bright red; dermal spines fairly numerous, about 24 μ long; middle leg with femur + trochanter 150 μ, tibia 90, tarsus (without claw) 100. Antennæ (in females full of eggs) 6-jointed. Formulæ: 31(26)45; 321(46)5. Measurements of joints in μ: (1.)30. (2.)27–36. (3.)87–90. (4.)24. (5.)21. (6.)24–27.

Hab.—Under rocks, Las Vegas, N. M., April 19th, etc. *(Wilmatte P. Cockerell).* I believe the roots it lives on are those of *Gutierrezia.* This is probably a distinct species.

Pseudolecanium Californicum (Ehrhorn).—This is to be added to the fauna of New Mexico; it was found in Las Vegas, on grass, by my wife and myself. It was determined by Mr. Parrott.

BOOK NOTICES.

MOSQUITOES: How they live; How they carry disease; How they are classified; How they may be destroyed.—By L. O. Howard, Ph. D. New York: McClure, Phillips & Co., 1901. I. Vol., 12 mo., pp. xv. + 241. (Price, $1.50; postpaid, $1.64.)

For nearly ten years Dr. Howard has applied himself to the study of the life-history and classification of North American mosquitoes, and to practical experiments for their destruction. His success in the latter direction has become widely known to the general public, while his scientific work has caused him to be looked upon by entomologists as our chief authority regarding these obnoxious insects. In the work before us he has embodied in popular form the results of his observations and investigations, and furnishes a most interesting and valuable handbook, written in attractive style and presenting in a clear and concise manner all that is known at the present time on this subject. The title of the volume gives an epitome of its contents, and shows at a glance how completely it covers the ground and how full of useful information it evidently is. We commend its perusal to all who suffer the tortures inflicted by these tiny creatures—that is, to almost every inhabitant of this continent—for the mosquito is ubiquitous and her attacks are often serious.

In the older settled parts of Ontario we are happily almost entirely free from annoyance by mosquitoes, but there are many localities where life on a warm summer's night is rendered almost unendurable by these tormentors. The author shows how this plague may, in most cases, be

got rid of with a little combined effort and without any very great expense. It is first necessary to acquire the knowledge that this book provides of the life-history and habits of the insect, and then to carry out carefully the remedial measures that have proved effective in a variety of instances. It is surprising to learn how successful intelligent efforts for the abolition of mosquitoes have proved in many places, and how comparatively easy it would be to adopt similar measures almost anywhere in mosquito-infested neighbourhoods.

One of the most interesting parts of the book is that on malaria, yellow-fever and other diseases which it is now proved are transmitted by the bites of mosquitoes. This is a subject of the deepest interest to the medical profession, and of the utmost importance to dwellers in tropical and sub-tropical regions. The author gives a concise account of the researches that have been made in various parts of the world, and the positive conclusions that have been arrived at; he also furnishes a complete life-history of *Anopheles maculipennis*, and points out the best methods of dealing with it and other disease-bearing species.

Enough has now been said to show the absorbing interest of the work and its value not only to those who live in mosquito-infested regions, but also to the medical profession in particular and to all who are attracted by the study of nature in any of its aspects, or who wish to know the results of the latest researches regarding a subject of great scientific and world-wide importance. C. J. S. B.

REPORTS OF THE EXPERIMENTAL FARMS OF THE DOMINION FOR 1900.—Ottawa: S. E. Dawson, 1901. One Vol., 8vo., pp. 494.

In these annual volumes, which are growing in size and value from year to year, may be found a vast fund of information on every variety of topic that can be of use or interest to the farmer, fruit-grower, gardener, stock-raiser or poultry-breeder in any part of the Dominion of Canada. They contain also much that is of value to those engaged in scientific work, especially to the chemist, the botanist, and the entomologist. The attention of the last mentioned we may draw to Dr. Fletcher's portion of the Report for 1900 (pages 195 to 249), in which he describes a number of the most serious insect attacks of the year, and relates the remedial measures that can be recommended in each case. The outbreak of the Hessian fly in Western Ontario is fully dealt with; this is followed by accounts of injury to wheat in the Northwest by the wheat-stem sawfly

(Cephus pygmæus), by cutworms and grasshoppers in Manitoba, and by excessive heat and drought over a large area of the Northwest last summer. The pea weevil and the pea aphis are described as very injurious, and growers are instructed how to deal with them; many pages are then employed in describing the variegated and spotted cutworms, their natural enemies and parasites, and the best methods of repressing their attacks. The San José scale and a variety of other insects are also discussed, and a list is given of a large number that have been injurious to fodder crops, roots and vegetables, and fruits. Honeybees have a chapter devoted to them, and this section of the Report is concluded with a description of the successful experiments made for destroying wild mustard by spraying with a solution of copper sulphate. C. J. S. B.

CORRESPONDENCE.

The Codling Moth.

Sir,—Prof. Gillette, of the State Agricultural College, Colorado, is trying to clear up some of the lacking information concerning that terrible pest of the fruit-grower, the Codling Moth, and I think some of our members may do very valuable work for horticulture in North America by co-operating with him and sending him accurate and careful observations, with exact dates, upon the points mentioned in the following extract:

Prof. Gillette says: "I am anxious for further information from some northern parts. I particularly want to know the date when larvæ of the first brood begin to leave the apples to spin, and what proportion of the larvæ taken about the middle of July or a little later will transform to moths the same season. To determine the first point, a few bands could be placed about bearing trees, and frequently examined for worms after the last week in June until the worms appeared. To determine the second point, a good number of the worms or pupæ could be taken when they are rather abundant under bands, probably about the end of July, and placed in boxes for rearing. I should be very glad to receive a number of larvæ taken any time in July from any place in Canada."

Prof. Gillette has done and is doing such excellent work in practical entomology that I feel sure some of our members who have an opportunity, without much trouble, to help in this important investigation will do so. The results will be given to the world, and all fruit-growers and fruit consumers will benefit. J. Fletcher, Ottawa.

Mailed June 29th, 1901.

Kirby's Insects of the Northern Parts of British America

—reprinted from *Fauna Boreali-Americana*, with notes by Rev. C. J. S. Bethune: synonymy of the Coleoptera revised by Dr. Geo. H. Horn. Nearly 450 species described. Price, including postage, 50 cents. Address:

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The Canadian Entomologist

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

AUGUST, 1901.

LONDON:
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1901.

WANTED.—A young man to act as secretary and assistant in entomology. Address, stating qualifications: HENRY H. LYMAN, 74 McTavish St., Montreal.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19*b*, 20, 23, 25*d*, 25*g*, 25*h*, 34*b*, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

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The Canadian Entomologist.

VOL. XXXIII. LONDON, AUGUST, 1901. No. 8

A LIST OF MANITOBA MOTHS.—PART V.

BY A. W. HANHAM, WINNIPEG, MAN.

(Continued from page 320, Vol. XXXI., November, 1899.)

The Geometers of this Province, in respect to both my own captures and those of other collectors which I have been privileged to see, appear to be fairly well identified.

In December last I was honoured by a flying visit from Mr. Hutchinson, of Kinosota, on Lake Manitoba. He brought in a whole collection of things with him, some for names, others for my benefit. Among the moths we were unable to tackle satisfactorily were a few Geometers. Our friend is developing into an enthusiastic entomologist, and we look for some good work from him in the near future. Few of us, I fancy, would care to be hampered with numerous cases of insects, in addition to other "impedimenta," when undertaking a seventy-mile sleigh drive in bitter weather to reach the nearest railway station.

Another enthusiast, Mr. Heath, has, I believe, made some fresh captures since I saw his things, and there may also be some additions lurking in Mr. Criddle's cases. I believe that everything in the collections of Messrs. Boger and Marmont has been located.

The comparatively small percentage of unnamed or doubtful species in this family is a matter for congratulation. At the same time, I question if it has received as much attention from us as the others already listed and no doubt species have been overlooked among the more difficult genera, as *Leptomeris*, *Eois*, *Tephroclystis*, *Eucymatoge*, etc.

My most successful collecting has been done at light, and many of my best things were taken in that way.

The season of 1900, though an unusually long one for Manitoba, was an "off" year for Geometers in this district, and there was a great paucity of both species and individuals. The snowfall was light, the spring an early and hot one, and no rain fell, worth mentioning, until the beginning of July. I have no doubt whatever that these weather

conditions had a good deal to do with the absence or scarcity of a large proportion of our usually common Bombyces and Geometers.

From time to time I submitted my unknown and doubtful captures to the late Rev. G. D. Hulst (whose recent classification has been followed in this list), from whom I always received kindly aid. I received a letter from him, dated but a few days before his untimely death, regarding two new species, which I have included in this list, named by him as recently as June 25, 1900. Help has also been given freely by Prof. H. G. Dyar, to whom my thanks are due.

Eudeilinea herminiata, Guen., has not been included in this list, as I understand it has been transferred to the Bombycidæ.

Dyspteris abortivaria, H.-Sch. July 1st. Elm Park. Rare.

Nyctobia fusifasciata, Wlk. May 18th and later. Quite rare.

Rachela Bruceata, Hulst. On the wing early in October. Not plentiful.

Paleacrita vernata, Harr. April. Not common here.

Alsophila pometaria, Peck. Seldom out before October. Common.

Eudule mendica, Walk. (Already listed with the Bombyces). Early in July. Abundant in dark woods.

Talledega tabulata, Hulst. May and July. Common at light and at rest on trees in woods.

Nannia refusata, Walk. (Harveiata, Pk.). End of June. Very common in Elm Park.

Tephroclystis implicata, Walk. June. A few at light.

" ornata, Hulst. June. Rare.

" miserulata, Grt. June. Rare.

" absynthiata, L. May and August. Here and at Brandon.

" zygædenata, Pack. June. Rare.

Tephroclystis raveocostaliata, Pack. Plentiful at light, middle of May, 1898.

Tephroclystis borealis, Hulst. (Unique.)

Tephroclystis latipennis, Hulst. First recorded from Quebec. Descriptions of these two new species appear on page 114, Vol. XXX. (1898).

Eucymatoge anticaria, Walk. (Strattonata, Pk.). Middle of June. Rare.

" intestinata, Guen. Early in July. Common at light.

" vitalbata, Hüb. June. Only a pair taken. Rounthwaite.

Venusia duodecimlineata, Pack. May. Rare here.

Venusia comptaria, Walk. (perlineata, Pack.). Rare. Another early thing.

Euchœca albovittata, Guen. July 4th, etc. Flies low in dark woods, and is difficult to follow.

Euchœca cretaceata, Pack. June. Have a pair from here and another from Quebec.

Euchœca lucata, Guen. June. Not uncommon in Elm Park, at rest on trees.

Euchœca albogilvaria, Morr. (Now Acidalia albifera, Walk. See September number of Entomological News.) June. Common in Elm Park.

Calocalpe undulata, L. July. Occasional in Elm Park, and at rest.

Philereme formosa, Hulst. Only one taken.

Eustroma diversilineatum, Hüb. July. At light.

" populatum, L. Middle of July, at light, but not plentiful.

Eustroma testatum, L. End of August. Common in ravine near Experimental Farm, Brandon.

Eustroma destinatum, Moesch. (and var. lugubratum, M.). Brandon and Rounthwaite. Another rather late species.

Plemyria hastata, L. Early in July. Rounthwaite and Cartwright.

" tristata, L. Middle to end of June. Rounthwaite.

" sociata, L. June into July. Common.

Percnoptilota fluviata, Hüb. Quite common here.

Mesoleuca ruficiliata, Guen. June. Not common.

" lacustrata, Guen. Fairly common. July.

" intermediata, Guen. Occurs here.

" truncata, Hüb. Quite rare here.

" hersiliata, Guen. Cartwright only.

" vasaliata, Guen. Kinosota. Rare.

Hydriomena sordidata, Fab. (var.). May 29th (one). Also from Cartwright.

Hydriomena trifasciata, Bork. Common. Appears to be double brooded.

" californiata, Pack. May 20th (one).

Hydriomena latirupta, Walk. Common. This species must be double brooded, as I took some this season at sugar, at Brandon, on October 10th.

Hydriomena multiferata, Walk. July 3rd. One at rest in Elm Park.

Triphosa dubitata, Linn. This species has much the same habits and tastes as the Noctuids; it turns up every season, but is never common. Have taken it at light in April, in May under log on ground and under loose bark of stump. On October 8th I took one at sugar, and in the fall and winter have found specimens in my cellar.

Cœnocalpe magnoliata, Guen. June. Not common here.

Gypsochroa designata, Bork. July. At light.

Xanthorhöe ferrugata, Hüb. Common, May and June, at light.

Xanthorhöe unidentaria, Haw. Appears to be rare here; have three specimens.

Xanthorhöe munitata, Hübn. Cartwright. Named for Mr. Heath by Prof. J. B. Smith.

Xanthorhöe montanata, Haw. Have a pair.

Hæmatopsis grataria, Fab. One of our common species; comes freely to light.

Mycterophora Slossoniæ, Hulst. I got my first specimen on July 15th, 1894, in the house; the second the following year, in my cellar. For description see page 120, Vol. XXX. (1898).

Synelys ennucleata, Guen. June and July. Elm Park.

Synelys alabastaria, Hᵘb. (reconditaria, Walk.). June and July. Elm Park.

Xystrota hepaticaria, Guen. Unique. Cartwright.

Cinglis purata, Guen. July 13th. I have only taken a pair.

Leptomeris quinquelinearia, Pack. June. Common.

" magnetaria. Cartwright.

Eois inductata, Guen. A common prairie species, on the wing early in June and in August.

Eois Hanhami, Hulst. Out early in June. Have only taken this species and the following in dark woods. (Elm Park.)

Eois persimilis, Hulst. Out early in June. Both these new species are described in June number of Vol. XXX. (1898).

Callizzia amorata, Pack. Taken at light, from middle of June into August. Not common.

Calledapteryx dryopterata, Grt. June 17th, etc. One or two taken at light. Mr. Hutchinson tells me that he finds this species fairly abundant at Kinosota, on Lake Manitoba.

Chlorochlamys chloroleucaria, Guen. June. Not very plentiful.

Nemoria subcroceata, Walk. Cartwright and Rounthwaite.

Eucrostis incertata, Walk. (gratata, Pack.). May into June. Common at Bird's Hill.

Synchlora glaucaria, Guen. End of June into July. Occasional at light.

Aplodes mimosaria, Guen. Out with glaucaria, but more numerous.

Anaplodes iridaria, Guen. (rectaria, Grt.). The only Manitoba specimen I have seen is in Mr. Boger's collection.

Brephos infans, Moesch. Mr. Heath has taken this at Cartwright.

Leucobrephos Middendorfi, Men. April 25th, 1896 (a ♂). Recorded in January (1897) number of CANADIAN ENTOMOLOGIST. Mr. Heath has taken this fine moth, and Mr. Dennis, of Beulah, sent me a ♀ for identification.

Epelis truncataria, Walk. Aweme and Cartwright.

Epelis Faxonii, Minot. June 12th, etc. Common locally on prairie. Flies freely during the day.

Eufidonia notataria, Walk. Middle of June. Particularly plentiful at Rounthwaite in 1899.

Orthofidonia exornata, Walk. June 11th. One at light. Taken also by Mr. Marmont and Mr. Hutchinson.

Orthofidonia semiclarata, Walk. End of May into June. Rare at Bird's Hill.

Orthofidonia vestaliata, Guen. Common. Our first white moth on the wing.

Gueneria basiaria, Walk. June. Not uncommon.

Deilinia elimata, Hulst. June. Occasional.

" variolaria, Guen. June. Quite common.

" erythremaria, Guen. June. Not uncommon.

" exanthemata, Scop. June. Not uncommon.

Deilinia solamata, Hulst. June 19th and July 22nd (1898). Single specimens flying by day on the prairie.

Sciagraphia granitata, Guen. July. Not at all common. Taken at light.

Sciagraphia denticulata, Grt. July 13th. A pair at light. More abundant at Rounthwaite.

Sciagraphia muscariata, Guen. Elm Park. Rare.

" heliothidata, Guen. One at light.

Sciagraphia continuata, Walk. Cartwright and Rounthwaite. Rather a rarity.

Sciagraphia mellistrigata, Grt. Common at light, middle of May and again in July.

Philobia enotata, Linn. June. Common in Elm Park.

Macaria eremiata, Guen. July 22nd (1898). One on prairie.

" dispuncta, Walk. June 29th (1898). One in Elm Park.

Diastictis ribearia, Fitch. July. Quite plentiful. Comes freely to light.

" sulphuraria, Pack.

Diastictis flavicaria, Pack. Both these species are out early in August; neither are common.

Diastictis pustularia, Hüb. (latiferrugata, Walk.) Have seen this from Cartwright and Rounthwaite. Appears to be rare.

Diastictis subalbaria, Hulst. Not common here.

" subfalcata, Hulst. July. A pair taken.

Sympherta Julia, Hulst. July 13th, etc. A few at light.

Apæcasia defluata, Walk.

Apæcasia atropunctata, Pack. Neither of these species appear to be common here.

Alcis sulphuraria, Pack. (baltearia, Hulst). July. At light; three specimens.

Alcis atrolinearia, Hulst. May 20th. One at rest on fence.

Amilapsis subatomaria, Guen. July 7th, etc. Elm Park, at rest on trees.

Paraphia deplanaria, Guen. Elm Park. Rare.

Selidosema humarium, Guen. One specimen only.

Selidosema umbrosarium, Guen. Common in Elm Park early in the summer. At rest on trees, sometimes congregating under loose bark.

Cleora indicataria, Walk. May 17th. One or two at light.

Cleora larvaria, Guen. One specimen only.

Melanolophia canadaria, Guen. May 22nd and later. Common and variable.

Ectropis crepuscularia, Schif. Plentiful early in the summer.

Lycia ursaria, Pack. Rounthwaite. An early species. (Appears to be plentiful at Kinosota.)

Lycia cognataria, Guen. June. Not uncommon at rest on houses, fences, etc., and some have been taken at light.

Nacophora quernaria, Ab. Sm. Cartwright.

Apocheima Rachelæ, Hulst. Mr. Marmont took a male of this species at Rounthwaite in 1898. The female, which is wingless and spidery, dropped into the grass and escaped. In 1899 he was more fortunate, capturing several males and a female. About dusk on April 27th (same year), I noticed a number of moths flying low about the ground and along the side of my house. I managed to bottle four, and later on, with a light, discovered a pair "in coitu" on my cellar window. On the 29th I took two more males at rest on the same window.

Erannis tiliaria, Harr. Cartwright and Rounthwaite. Have not taken it myself in Manitoba.

Cingilia catenaria, Cram. A September species. Brandon and Rounthwaite. Mr. Marmont finds them very abundant in a small swamp near his place. Those I have seen from Manitoba have been white; those from Quebec invariably smoky.

Dyscia orciferata, Walk. A typical prairie species. Taken at Bird's Hill, and quite common at Rounthwaite in 1899. On the wing from early in June into July.

Anagoga occiduaria, Walk. May 22nd, one, and another at light in June.

Sicya macularia, Harr. July 19th, etc. Common at light in 1897 for about a week; also taken at Brandon.

Therina endropiaria, G. & R. Quite rare here.

Therina fervidaria, Hüb. Aug. 18th, etc. Common in Elm Park, at bloom; comes occasionally to sugar.

Metrocampa perlata, Guen. July 19th, etc. Not uncommon at light in 1897.

Eugonobapta nivosata, Guen. July. A few at light.

Ennomos subsignarius, Hüb. Aug. 9th to Sept. 22nd. A few at light.

Xanthotype crocataria, Fab. Plentiful at beginning of July.

Plagodis serinaria, H.-S. Taken at Kinosota by Mr. Hutchinson. Appears to be rare in the Province.

Plagodis phlogosaria, Guen. Cartwright.

Hyperitis amicaria, H.-Sch. (and var. alienaria, H.-S.). May 20th, and common in June. Some of the varieties are very handsome.

Ania limbata, Haw. July. A few at light.

Gonodontis hypochraria, H.-Sch. On the wing from the end of May to the end of June.

Gonodontis Warneri, Haw. June 17th and 20th. Here and at Rounthwaite. Not common.

Euchlæna obtusaria, Hüb. Rare at light in June.

Euchlæna effectaria, Walk. Common at light in June.

Euchlæna Johnsonaria, Fitch. (bilinearia, Pack.). A few at light about the middle of June.

Euchlæna amœnaria, Guen. Cartwright.

Euchlæna pectinaria, Schif. (var.). Rare at light in June. This is one of our most handsome Geometers.

Euchlæna abnormalis, Hulst. June 22nd, 1898. One specimen taken at light.

Selenia alciphearia, Walk. May 20th. A pair at light.

Metanema inatomaria, Guen. July 3rd, etc. Not uncommon at light.

Metanema determinata, Walk. June 17th. A pair at light; also from Cartwright.

Pryocycla armataria, Guen. May 24th (1898). One at light.

Azelina peplaria, Hüb. (Hubnerata, Guen.) (and atrocolorata, Hulst.). June 4th, etc. Common at light in 1898.

Azelina Behrensata, Pack. June. A few at light.

Caberodes confusaria, Hüb. (and var. metrocamparia, Guen.). July. Winnipeg and Brandon. Not common.

Tetracis crocallata, Guen. June into July. A few at light.

Sabulodes lorata, Grt. June into July. Also at light.

Sabulodes sulphurata, Pack. (near var. imitata, Hy. Edw.). A poor specimen taken at light in June.

Sabulodes depontanata, Grt. (now Hypererytha arcasaria, Walk. See September number of Entomological News). Cartwright.

Sabulodes transversata, Dru. End of August to middle of September. Very common at light and at bloom.

Abbottana clematariа, Ab. & Sm. May 13th, etc. Rather rare here; plentiful with Mr. Hutchinson.

We may congratulate DR. H. GUARD KNAGGS on the fact that his "Lepidopterists' Guide for the Use of the Young Collector of Butterflies and Moths" has this year been reprinted for the third time. (Published by Gurney & Jackson, 1 Paternoster Row, London, E. C., England. Price, one shilling.) It is 30 years since the first edition appeared, and many thousand copies have been sold during that time. Though written so long ago, it is as useful and interesting as ever.

NOTES ON THE EARLY STAGES OF CATOCALÆ.

BY G. M. AND E. A. DODGE, LOUISIANA, MO.

Catocala Clintonii.

Egg, deposited June 21st, 1900, is a disc concave below and convex above. The ornamentation consists of a series of ridges converging from the slightly upcurved edge to a central depression which has in its centre a slight tubercle. Colour dark, or blackish. Hatched April 17, 1901.

Larvæ escaped by cutting a hole at one side of the centre above.

Newly-hatched larvæ slender, nearly ¼ inch in length, dark pruinose. Head paler, no marks apparent.

After first moult they are somewhat lighter in colour. The two rows of dorsal tubercles appear as black dots. The head is light, the lobes surmounted with black.

On the tenth day one larva was one-half inch in length, blackish, but paler than at first. Gray sagittate spots along the dorsum indicated the dorsal stripe. Tubercles small and black. Posterior dorsal part of 8th segment black, and dorsal tubercles on anal segments surrounded by black patches.

Head about same colour as body. Three days later this larva measured seven-tenths inch in length. The colour had become gray tinged with red. The usual longitudinal stripes were obsolete, but the darker patches following each of the dorsal tubercles gave the effect of indistinct interrupted subdorsal stripes.

Head quite small, slightly darker than the body, mouth-parts white. A triangular dark patch, apex downward, near summit of each lobe in front.

There were numerous light-coloured filaments. The most distinctive feature was the black band of eighth segment enclosing, centrally, a quite prominent, thick, rounded tubercle or horn, the tip of which was pale gray.

Tenth segment raised posteriorily and marked by two black dashes nearly meeting across the dorsum.

The eleventh segment was also elevated in same way, the posterior part being marked by a much curved black line bounding the raised portion posteriorly.

Head bordered behind with brown.

May 1st, newly moulted. Light gray, the dark patches of the dorsal tubercles having disappeared.

Tubercles white anteriorly and black posteriorly, markings of head as before. Band of eighth segment paler brown, except around base of central tubercle. This last, short, rounded and bent backward. Filaments white, compound, broad at the base, and dividing into about five points.

May 7th, mature larvæ. Uniform reddish gray. Head brown in front, except lower part white, each lobe surmounted by a yellowish spot. Head bordered with dark brown behind. Dorsal stripe indistinct. Tubercles inconspicuous. The dorsal horn of eighth segment is reduced to little more than an acuminate ridge, with summit slightly if at all paler than body colour. Head somewhat elevated; body much flattened. The numerous filaments seem to originate from an extension of the skin along the sides. Very slight black markings on anal segments. Began spinning up May 17th. Two pupæ. One of these is in a thin silken cocoon partially covered with sand and leaves. It measures about three-quarters of an inch in length and is pale red, the head and thoracic parts having a greenish tint. No bloom.

The second pupa is covered with a heavy bluish bloom, through which the red of the abdominal parts shows faintly. Gave imago June 4th.

This larva hatched so early that few trees had opened their buds. We gave them a mixture of everything that seemed to be available, and in each of three lots they selected plum. The larvæ, however, did not do well on plum. They ate it readily enough, and seemed to thrive, but died off from time to time until, of some fifty hatched, only about four or five made pupæ.

May 3rd a single wild larva, mature, was found under an apple tree and fed to pupation upon apple. Hence, it may be safe to infer that apple is the proper food-plant for this species.

Clintonii has for two years past been the earliest of all our Catocalæ specimens, having been taken June 6th or 7th in each year. Previous to that we had not collected.

Catocala minuta, Edw.

Food-plant, *Gleditschia triacanthos* (Honey locust).

Eggs deposited June 23rd, 1900, in crevice of the bark, seventy or more in a compact mass or cluster. Smooth, shining, about twice as long as broad, rounded at the ends, colourless.

Hatched April 21st, 1901.

Buds were just beginning to expand on the honey-locust trees.

Newly-hatched larvæ white, semi-translucent. A small dark spot on each side of the head. Length about three-twentieths of an inch. As soon as full fed they are green and scarcely distinguishable from the leaf upon which they rest.

April 30th they had attained a length of about two-tenths of an inch.

Colour reddish gray, narrowly striped with whitish on the sides, and with a rather broad, light dorsal stripe. Head pale gray.

May 4th, after the second moult, they appeared of a dusky green colour. Dorsal stripe white. Sub-dorsal and stigmatal stripes broad, dark and edged with white.

All the tubercles black, ringed with white at the base. Eighth segment with the usual dark band, but no protuberances. Head dark, mouth-parts white. Black cervical and anal patches.

At this point the larvæ showed much variation in colour.

One form was sooty or rusty black, darkest on sides; another was pale, whitish, without black cervical or anal patch, and transverse band of eighth segment but faintly dark.

At the succeeding moult this variation was still more pronounced, but in the majority of specimens the colour was black, with a broad yellowish dorsal stripe broken by the velvety black band of eighth segment. Sub-dorsal stripes outlined with white. Face and feet black. Sides black except on anterior upper part of eighth segment, where appeared a large oval yellow or red patch contrasting strongly with the body colour. Usually there was also a yellow patch or line across the dorsal portion of segment four.

The eighth segment had a rather high transverse ridge, and on the anal segments the dorsal tubercles were long and black.

Length at this stage three-fourths of an inch. A few whitish filaments appeared along the sides, only four or five at most to any one segment.

As the variations in colour are numerous, while the form does not materially change, a description of the mature larva will suffice and avoid repetition.

May 12th, length one and three-fourths inches. Form slim and rather long for the size. Not greatly fusiform.

Head black behind, dusky in front, with a very small light spot near top of each lobe.

Body brownish black, with a paler dorsal stripe, and broad whitish patches on dorsal surface of segment four and portions of segments seven and eight. The patch on four is usually shaped like a W, with open part forward.

Tubercles white in front, black behind, and followed by black patches, but on the anal segments the dorsal tubercles are quite large and reddish brown in colour.

Band of segments eight and nine broad and deep velvety black.

Ridge of segment eight rather high, inclined backward, and tipped with white or with white flecks on the summit.

Filaments very few, barely noticeable.

Body beneath greenish yellow, with large black spots.

By May 19th upwards of fifty of these larvæ had spun up and mostly pupated, all being the progeny of one moth.

Pupa enclosed in a rather strong silken cocoon covered with leaves, sand or whatever material was to be had.

Length of pupa about three-fourths of an inch. Slender. Only two-tenths inch wide at its widest part. Bloom rather heavy.

Gave imago June 4th.

This is a very active larva in all stages of its growth. The imago is not very common here, although we have taken a number of them, including the three forms included under *minuta* and its varieties.

Catocala Judith, Strecker; *Levettei*, Grote.

Description of mature larva taken hiding under bark on trunk of hickory.

Food-plant, hickory.

Form of body low and flat; no elevations on any segment. Length, June 1st, one and three-fourths inches. Head, wider than thoracic segments, grayish streaked with pale brown, these streaks uniting upon summit of each lobe and there forming a wider longitudinal streak.

Mouth-parts black, and from each side a black stripe runs up on the cheek about one-tenth of an inch, ending in a point.

Colour, black, closely reticulated throughout with greenish white, making the general colour appear greenish black.

Tubercles white, small, but, from the contrast of colour, very distinct. Cervical and anal plates black. No filaments.

Ventral surface greenish white, each segment marked with a dull brownish spot.

Spun up June 3rd, among leaves. Length of pupa, nine-tenths of an inch; width, five-twentieths.

Colour, pale reddish, with a thin whitish bloom.

Gave imago June 24th.

The larvæ of this species is rarely found except hidden under the loose scales of bark on the trunks of hickory trees. Later the imago may often be found also hidden under bark.

Like many Catocalæ, it is quite common some years, but such a season may be followed by years of scarcity.

It appears to be but little subject to variation. We have not seen the form *miranda*, Hy. Edw., here, and would like to correspond with any one who takes it.

Catocala obscura, Strk.

Larva taken under bark of shell-bark hickory, May 12th, 1901. Food-plant, hickory. Length at maturity, two and one-half inches.

Description of mature larva: Colour, dusky gray. Head broad, but not high, whitish with pale brown markings and a small, ill-defined black blotch at corners of mouth.

The dorsal stripe is interrupted on fourth to ninth segment, inclusive, by black, curved patches that occupy the space between the dorsal tubercles, and opening backward, enclose white, cone-shaped patches, apex forward and truncate behind. Tubercles small and white; no filaments. There is no elevation and no dark band on segment eight. Segment eleven is slightly raised and bordered behind with black; legs pale greenish, marked with some blackish spots.

Below greenish white with large black spots, except on thoracic segments and segments eight and nine.

Pupa: length, half an inch; width, about three-tenths of an inch.

Colour, pale red with a thin bloom.

Imago, July 2nd.

Catocala epione, Dru.

Larva taken under loose bark on hickory. Food-plant, hickory.

May 19th, mature larva; length, two and two-tenths inches. Colour, pruinose. Head narrower than following segment; brown, with a black stripe over the top and down each side to the mouth, with a vertical spur between the lobes. The dorsal stripe is composed of four, or two pairs of, wavy white lines which coalesce on the posterior segments, a similar series of white lines also ornamenting the side, and a double, white subventral line.

The tubercles are small and scarcely discernible except on anal segments, where they are outlined with black. There is a dark stripe along the spiracles, which are black. No filaments. Ventral surface pink, with all the spots black and conspicuous.

May 20th, spun up. Pupa: length, one and one-tenth inches; width, three-tenths inch. Gave imago June 19th.

Catocala habilis, Grt.

Larva taken early in June, under loose bark on hickory. Food-plant, hickory.

June 16th. Length, two and two-tenths inches. Colour, greenish black; very smooth and glossy. Head wider than first segment, pale, with slight brown markings, and with a broad, irregular, black stripe from mouth to top of lobes. The dorsal stripe scarcely paler than the general colour. Tubercles whitish, minute. No ridge or prominence and no transverse band. No filaments.

A very black stigmatal stripe, distinct to the extremities, forms a sharp line of demarcation between the blackish colour above and the greenish gray of the sub-stigmatal region. Ventral surface greenish white, with dusky spots on the central segments only. Spun up June 22nd. Gave imago July 12th, 1901. The larvæ of *habilis* and *Judith* are very similar in appearance and habits, but may be readily distinguished from each other by the black stigmatal stripe and black marks on the head of the former. Occasional larvæ are much paler in general colour, but retain these distinctive markings.

A NEW VARIETY OF CICINDELA VULGARIS.

BY EDWARD DOUBLEDAY HARRIS, NEW YORK.

A undescribed variety of *Cicindela vulgaris*, Say, is reported from the basin of the Rogue River, in S.-W. Oregon. Twenty specimens taken during the month of April of this year, and closely representative of the local tribe, present no differences except a slight one in shade of colour, indicating, apparently, that the variety is well established and worthy of a descriptive name. The elytra markings are identical with those generally recognized as possessed by *vulgaris* proper. It is slightly narrower and the upper surface more convex than the type. The colour is a dull coppery green, the metallic hue being more apparent, as is usual in other species, at the edges of the elytra. It seems to be a connecting link between the type and variety *vibex*, Horn. Its habitat suggests the name *C. roguensis*.

A NEW GOOSEBERRY PLANT-LOUSE.

BY W. P. AND T. D. A. COCKERELL.

Myzus Neomexicanus, n. sp.—*Winged form.* General colour of head and thorax black; prothorax sage-green with a transverse black shield, narrowest in the middle; sides of thorax green; antennæ black; wings clear, stigma and nervures very dark brown; abdomen sage-green, four quadrate black marks on each side anterior to honey-tubes, the last sometimes a mere speck; honey-tubes blackish, darkest basally; segment bearing honey-tubes with a few black spots, this and the following two segments with transverse black bands; legs black, tibiæ brown. Ocelliferous tubercle prominent; frontal tubercles low and broad, these and first antennal joint very slightly gibbous. Honey-tubes not swollen, 300 μ long and 40 broad, 200 μ short of tip of abdomen, cingulate. Body about 2100 μ long, antennæ about 1030, half length of body. Tibia of anterior leg 700, of hind leg 880 μ. Antennal joints (counting the so-called 7th joint as 6b) measuring: (1) 70, (2) 60, (3) 270, (4) 190, (5) 184, (6a) 100, (6b) 270.

Apterous ♀. Clear apple-green (turns yellow in balsam), head and thorax lighter; eyes black; legs, antennæ and honey-tubes yellowish-green like head; fifth and sixth joints of antennæ and tip of honey-tubes dusky; rostrum extending to middle coxæ; lateral tubercles at sides of prothorax (also in winged form), in region of hind legs, and posterior to nectaries, six (three pairs) pointed tubercles in all; cauda elongate, with rounded, sparsely hairy tip; legs long, hind tibiæ bristly. *No capitate hairs.* Very young specimens have red eyes.

Body (adult) about 2430 μ long, antennæ about 1000; honey-tubes 380 long, 50 broad, the tips level with basal part of cauda; tibia of anterior leg 700, of hind leg 940. Antennal joints: (1) 70, (2) 60, (3) 250, (4) 190, (5) 184, (6a) 100, (6b) 230.

Hab.—On wild gooseberry (*Ribes*, probably *R. leptanthum*) in an arroyo about five miles S.-W. of Las Vegas, New Mexico. Abundant at ends of twigs, June 2, 1901; not curling leaves. Attended by *Lasius*. Noticeable for the short antennæ, three pairs of lateral tubercles, and lack of capitate hairs. It is similar in many respects to *M. ribis* and its allies, but evidently distinct. From *M. ribis* proper it differs by the green apterous ♀ without capitate hairs and without a dorsal quadrate mark; from *M. ribis trifasciata* by similar characters, though the coloration of the winged forms is more similar; from *M. ribis Bucktonii* by the

absence of capitate hairs, and abdominal markings of winged ♀; from *M. Targionii* (which it resembles in not curling the leaves) by the character of the markings. It is evidently a native species (it occurs far from any gardens), and we may expect that it will attack cultivated gooseberries and currants as soon as it gets a chance. The allied forms cited above, already known as garden pests, are natives of Europe, though the first has been introduced into America.

We take this opportunity to record *Rhopalosiphum violæ*, Pergande, on house violets in Las Vegas, N. M.; it has not before been reported from New Mexico.

SOME OBSERVATIONS ON THE DEVELOPMENT OF FENISECA TARQUINIUS, FAB.

BY A. I. GOOD, WOOSTER, OHIO.

On October 27, 1900, while walking through some woods along a creek near Wooster, Ohio, my attention was drawn to some white masses on Black Alder (*Ilex verticillata*, Gray). These masses proved to be plant lice covered with a white down. A couple of branches were broken off and taken home. There were found among these masses of lice, and concealed by them, several small, slug-like larvæ about .75 inch in length. The lice, through the kindness of Prof. F. M. Webster, were identified as *Schizoneura tessellata*, Fitch.

The larvæ in a few days became restless, as if wishing to pupate, and on being given a suitable place, soon fastened themselves up, and within a day or two passed into the pupal stage; then we knew that we had the curious monkey-faced pupæ of the little butterfly, *Feniseca tarquinius*. In all, six of these pupæ were obtained, but owing to unfavorable conditions only three of them developed to adults. Other larvæ were found about the first of November, but owing to severe cold weather the majority had perished. Some of these last larvæ were not fully grown, and could hardly have belonged to the first brood.

The strange part is, that to all appearances the food of the larvæ consisted of these lice. The butterfly is not common in this locality, and this is the only time that I have taken it in any form. The larvæ have somewhat the appearance of those of some of the Lady Beetles.

I well remember when with my father, Rev. A. C. Good, we first found the larvæ and pupæ of *Spalgis s-signata*, Holland, in West Africa, and despite their unusual appearance, the larvæ found near Wooster strangely recalled to my mind those of the West African species, though it was not until my Ohio larvæ pupated that I felt sure of their identity.

SOME NEW OR LITTLE-KNOWN BEES.

BY CHARLES ROBERTSON, CARLINVILLE, ILL.

Andrena krigiana, n. sp.

♀.—Black; mandibles rufous at tips, toothed near the apex; basal process of labrum short, subquadrate, emarginate; clypeus somewhat shining towards apex, where it is rather distinctly punctured, elsewhere opaque and reticulated; face before ocelli longitudinally striate; facial foveæ quite short, not descending below insertion of antennæ, filled with a fine pubescence which appears black; antennæ short, joint 3 as long as the next three together, or nearly so, apical joints dull testaceous beneath; thorax throughout opaque and finely reticulated; enclosure of metathorax poorly defined, but rather strongly rugose; pubescence of head and thorax rather thin and dull fulvous; wings subhyaline, nervures and stigma honey-yellow, second cubital cell about one-third as long as the third, oblique, receiving the first recurrent nervure at, or a litttle before, or a little beyond, the middle; abdomen shining, rather sparsely and rather evenly punctured, apical margins of segments pale testaceous, hardly subfasciate, fimbria fulvous; scopæ pale, the hairs of hind tibiæ rather strongly plumose. Length, 8 mm.

♂.—Resembles the female; the face before ocelli not striate; clypeus with a large trilobed yellow spot. Length, 8 mm.

Carlinville, Illinois; 13 ♀, 1 ♂ specimen.

Paralictus, n. g.

This is proposed as a new genus for the reception of *Halictus cephalicus*, Rob., as the type, and *H. platyparius*, Rob., and the following species as congeners:

The venation, proboscis, hind spurs and general characters are the same as in the small, dull greenish species of *Halictus*. The cheeks are broad, mandibles simple; labrum concave, not produced, terminal lobe not produced to a laterally compressed, strongly pectinate point, but broad and flat, more as in *Sphecodes;* anal rim and scopæ obsolete, or nearly so, quite different from *Halictus*. Of ten female specimens, none have any pollen in their meagre scopæ, and I am quite certain that these females do not collect any pollen. I captured both sexes of *P. cephalicus* at a bank filled with nests of *Halictus zephyrus*, and I suspect that this species is an inquiline of that *Halictus*.

Paralictus simplex, n. sp.

♀.—Closely resembles *P. platyparius*, Rob., but may be readily distinguished by the cheeks being broad and rounded, not produced to an obtuse angle as in that species.

Carlinville, Illinois; 3 ♀ specimens.

Halictus truncatus, n. sp.

Halictus similis, Robertson, Trans. Am. Ent. Soc., 22: 145, ♀, 1893.

Halictus similis, Robertson, Trans. Acad. Sci., St. Louis, 10: 52, ♂, 1900.

This species and *H. arcuatus*, Rob., have both been identified as *H. similis*, Sm. It is doubtful to which one that name applies, or whether it applies to either of them.

Melissodes cnici, n. sp.

? *Melissodes desponsa*, Smith, B. M. Cat. Hym., 2: 310, ♀, 1854.

Melissodes nigripes, Smith, ibid. 311, ♂ (not ♀).

Melissodes desponsa, Robertson, Trans. Acad. Sci., St. Louis, 7: 354, ♀, 1897.

This is an oligotropic visitor of thistles. It is abundant on the flowers, the female getting her pollen exclusively from them. Two males taken on *Monarda fistulosa* are the only specimens of this species taken on any other flowers.

Melissodes dentiventris, Sm.

? *Macrocera Americana*, Lepeletier, Hist. Ins. Hym., 2: 92, ♂, 1841.

? *Melissodes* ~~*obliqua*~~ *desponsa*, Smith, B. M. Cat. Hym., 2: 310, ♀, 1854.

Melissodes dentiventris, Smith, ibid., 212, ♂.

Melissodes dentiventris, Robertson, Trans. Acad. Sci., St. Louis, 7: 353, ♀, 1897.

This was identified for me by Mr. Cresson as *M.* ~~*obliqua*~~ *desponsa*, Sm., and is about as likely to prove to be the true *M.* ~~*obliqua*~~ *desponsa* as the preceding is. Specimens which are a little faded and in which the oblique fasciæ of abdomen are not evident would readily be identified as that species. The preceding, being an almost exclusive visitor of thistles, is more likely to be overlooked. *M. dentiventris* has been taken on the flowers of sixteen species of nine different genera. The determination of *M. Americana* is too doubtful to justify its use.

* Can. Ent. 34. p 49.

Melissodes trinodis, n. sp.

Melissodes Pennsylvanica, Robertson, Trans. Scad. Sci., St. Louis, 7: 355, ♀ ♂, 1897.

Besides the characters mentioned in the place cited, which distinguish this species from *M. agilis*, Cr., the maxillary palpi may be mentioned. Eighty-two per cent. of my specimens have the maxillary palpi three-jointed, while in the others the fourth joint is very minute. On the other hand, eighty-four per cent. of my specimens of *M. agilis* have the maxillary palpi four-jointed.

This species has been identified as *M. dentiventris*, Sm., and I have called it *M. Pennsylvanica*. Cresson thought his *M. aurigenia* might be the same as *M. Pennsylvanica*, Lep., which is quite as likely.

Epeolus, Latr.

The maxillary palpi are two-jointed, but with only one free joint, so that it appears one-jointed. To this belong *E. bifasciatus*, Cr.; *zonatus*, Sm.; *compactus*, Cr.; *pusillus*, Cr.; *interruptus*, Rob., and the following. It is my opinion that these insects are inquilines of *Colletes*, as in the case of the European *E. variegata*.

Epeolus lectoides, n. sp.

♀.—Closely resembles *E. lectus*, Cr., and may be the same, but it is smaller, the mandibles, tubercles and tips of scutellar spines, ferruginous; tibial spurs ferruginous, not black; abdomen not strongly punctured, apex of segment 5 with a subtriangular, silvery cinereous patch; last ventral segment black. Length, 9 mm.

Carlinville, Illinois; 1 ♀ specimen.

Triepeolus, n. g.

The maxillary palpi three-jointed, with two evident free joints. To this belong *E. concavus*, Cr. (type); *remigatus*, F.; *nevadensis*, Cr.; *lunatus*, Say; *donatus*, Sm.; *Cressonii*, Rob.; *helianthi*, Rob.; *pectoralis*, Rob. I think that these insects are inquilines of Melissodinæ, as Mr. Ashmead has already observed in the case of *E. donatus* and *Eutechnia taurea*.

Chelostomoides, n. g.

This is proposed as a new genus for the reception of *Megachile rufimanus*, Rob. It has the general characters of *Megachile*, apical joint of maxillary palpi quite long, hairy; in female the clypeal region is excavated, the mandibles long, narrow, tridentate.

ACRONYCTA AND TYPES.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

In his note on p. 191, Dr. Dyar raises an interesting question, concerning which I would like a general expression of opinion for my own guidance.

Among the material received for study by M. Guenée from the British Museum, perhaps also from other sources, was a considerable number of specimens and drawings collected, bred or drawn by John Abbott, of Georgia.

Not all of the Abbott drawings went to the British Museum, for I saw some in Paris ten years ago, and not all the Abbott drawings have been identified, for I saw in the British Museum many pictures representing insects that have not been taken since, so far as I know, while I identified a few recently described, among these century-old drawings.

It was Abbott's practice to draw and paint the species bred by him, so as to show the stages and the food-plant on one card; but he also made separate drawings of a great many specimens concerning whose early stages he knew nothing.

The originals of his drawings are not always represented by existing specimens. I do not know whether there ever was a definite association between an individual received in Europe and any one drawing.

At all events, Guenée received specimens and drawings, and he made very free use of the drawings, especially in his descriptions of early stages. He always cites such cases as "decrit sur un dessin par Abbott." He does not always say that the adult described by him also came from Abbott or what evidence he had that larva and adult were correctly associated.

In some cases he had no adults at all, and his descriptions are avowedly from the pictures only. Some of these pictures I have failed to find, but they may be still in existence.

Question 1.—What standing has a specific name avowedly based on a drawing made by another, the original of which the describer has never seen and which may or may not be then in existence?

My own strong impression was, that as such descriptions never had a type—that is, were not made from an actual specimen—they should be ignored. Yet, my practice has not been in accordance with this, and there is now at least one species of North American Noctuids listed which is utterly unknown in nature to any living entomologist. The

description of the adult is not bad, and the description of the larva is so good as to make it certain that if it is ever found on the given food-plant, its identification will be reasonably satisfactory.

Several other species have been so identified, and the names are in common use.

Concerning the species of *Acronycta*, it is certain that Guenée has mixed things, and he may have done so in two or three different ways. If the drawings of the adult and larva were not on the same sheet, he may have changed the association, or it may have been changed before it got into his hands. If there was an adult from Abbott, it may not have been the specimen actually bred, but one associated with it as a form or variety. In those early days variation had a wider range, and it is not incredible that "*hamamelis*" and "*afflicta*" might have been considered the same, specifically. Finally—and this I consider the most probable—Guenée actually described his species from Abbott's drawings, but incorrectly identified the examples before him with the drawing from which he had just made his description. He does not say this, however, but alleges specimens in existence.

Question 2.—Under the circumstances, shall the specimens referred to by Guenée and labeled by him be considered as the types, or shall the description of the larva determine the species intended?

Personally, I have decided to accept the labeled adult as representing the species, though I have no doubt that the association of adult and larva was due to a mix-up, and was an error. The adult was first described; the error is in applying the larval description.

Finally, it is, of course, a serious deprivation to be without a sense of humour, but at the risk of losing all reputation in that direction, I must yet confess an utter inability to see anything funny in Dr. Dyar's original note concerning types. He says the suggestion that the type be now destroyed was a joke. He must know, of course, and therefore my remarks, based on an ignorance of that fact, have lost their point and must be withdrawn. I have no apology to make, for they were fully justified by the literal meaning of the expression criticised by me.

There are altogether too many of my own types in the U. S. National Museum to make the matter anything but a serious one to me, and I have too much other material that I expect to send there to make such remarks a matter of indifference.

I will say, however, in justice to Dr. Dyar and to myself, that I did not really believe that he would actually or in any way neglect or allow harm to come to any of the types or other material in his custody in the U. S. National Museum, or would carry out the natural inference to be drawn from his words. I had too much regard for and confidence in him as a man to believe that; but I did believe that he gave expression to a conviction that the importance of types had been overrated, and that nomenclature would be more stable were there none to be referred to. In which, after all, he may be right.

THE EFFECTS OF SCORPION VENOM.

BY O. W. BARRETT, CLARENDON, VERMONT.

The prevailing belief in regard to scorpion stings seems to be correct: dangerous, but seldom fatal.

However, there are scorpions *and* scorpions. Moreover, much depends upon the season and the part stung. Generally speaking, a sting in the dry season is much worse than one in the rainy season, because the venom becomes concentrated during the period of lesser activity. And for obvious reasons a sting in the head, neck or trunk of body is worse than one in the extremities.

In Mexico the brownish-black species (*Vejovis crassimanus*, Pock.; *V. mexicanus*, Koch, and others) which passes under the name of "alacran prieto" is comparatively harmless; it prefers a moist habitat and is "slow to anger." But the larger brownish-yellow species (*Centrurus*, sp.) called "alacran huero" are perhaps the most poisonous Arthropods in the world.

Having experienced the full effect of the dry-season venom of a large "huero" (as well as that of other species), I am able to give evidence that is not of the "hear-say" kind.

The pain from the sting is local and very intense for five to ten minutes, until the life of the adjacent nerves is simply killed out. As the ptomaine-like poison spreads into the tissues the involuntary movements and cramps of affected muscles begin. In about half an hour the nearest lymphatics become very painful, and the action of the poison can be felt throughout the system. Then, especially if the sting be in the upper extremities, a period of sneezing begins, and may last an hour or more. This is a reflex action from the cervical ganglia, the functions of which have been deranged by the rapid absorption of the poison into the

lymphatics. The throat feels as if there were a wad of cotton in the fauces, and thirst is satisfied only with great difficulty, since the act of swallowing is accompanied with pain and a "scary," prickling sensation in the pharynx.

After two or three hours the acute pain subsides gradually, but the intense soreness of the flesh near the part stung and the more or less complete paralysis of the muscles and throat continues, and may last for days. Strong heart action is needed to carry the victim past the sixth hour if the sting be a bad one. Death among children and weak persons results apparently from paralysis of the thoracic muscles. Artificial respiration and heart stimulants may be necessary at the crisis.

The secondary symptoms are quite unpleasant, if not dangerous. The membranes of the pharynx become deeply affected, and seem to crack open and slough off, with the result that small ulcers and pus patches appear on the second or third day, and may give trouble for a week. Fever develops within twelve to twenty-four hours, and lasts several days, according to conditions. It is the type of fever which usually follows any great lymphatic disturbance, but it is likely to arouse any latent malaria which the system may contain.

Death from scorpion stings is common among children under six years of age in the Mexican States of Durango and Guerrero. On account of the very many fatal cases in the City of Durango, the authorities have placed a bounty on the tails [sic] of scorpions killed therein.

The whip scorpion *(Mastigoproctus giganteus)*, or "vinaigrillo" [so called from its strong odour of vinegar], lives under stones and in loose soil, and is nocturnal in habit. The sting is a straight spine situated near the base of each "jaw," and thus the victim is very likely to get *two* doses at once of a venom which is said to be more powerful than that of the true scorpion. At Cuernavaca I was told of a field labourer who was found dead, but *sitting bolt upright*, so great had been the nervous shock and muscular cramping from a "vinaigrillo" sting.

Wherefore, if might be right, the scorpion is "O K."

It is with deep regret that we announce the death of our esteemed friend, Miss Eleanor A. Ormerod, which took place at her residence, St. Albans, England, on Friday, July 19th. Owing to her advancing years and failing health, she had recently given up her work in economic entomology. We hope on a future occasion to give some account of her life and the practical and scientific work that she accomplished.

A NEW XIPHIDIUM FROM FLORIDA.

BY A. P. MORSE, WELLESLEY, MASS.

Xiphidium gracillimum, sp. nov.—Very slender. Brown above, face and sides greenish, wing veins purple; a conspicuous dark brown mid-dorsal stripe on the head and pronotum, bordered by broad pale bands, sometimes with dusky or purplish markings on the cheeks, sides of pronotum and middle of face. Antennæ brown, extremely long and slender. Eyes very prominent, in side view circular in outline. Fastigium of the vertex ascending, strongly advanced (about the length of the eye seen from above), very narrow (about one-fourth the distance between the eyes), its sides parallel or slightly convergent. Lateral lobes of the pronotum usually triangular in outline by the exceptional reduction of the anterior ventral angle and the straightening of the posterior margin, which forms a line with the hind margin of the posterior process, the humeral sinus distinct but shallow.

Anterior tibiæ with 5 or 6 pairs of spines. Hind femora slender, unspined below, the genicular lobes spined. Sub-genital plate of male truncate; cerci slender, the internal tooth broad at base, slender and acuminate at tip, the apical portion of the cercus elongate, two or two and a half times as long as wide, with the distal half strongly depressed and tapering to a narrow, rounded point, its sides a little sinuous, sub-parallel. Ovipositor of female straight, about two-thirds as long as the hind femora, and barely passing their tips, slightly widened in the middle portion, tapering evenly to an acute point, with the ventral margin a little more convex than the dorsal.

Antenna: ♂, 40–58; ♀, –. Body: ♂, 12–14; ♀, 15. Post. fem.: ♂, 10.5–12; ♀, 13. Teg.: ♂, 14 5–17; ♀, 18.5. Ovip.: 8. Cerci of ♂, 1.5. Total (vertex to tip of wings): ♂, 21.5–25; ♀, 27 mm.

One ♂, April 4, Capron, Fla. Four ♂, one ♀, Biscayne Bay, Fla., Mrs. A. T. Slosson. All from the collection of Mr. S. H. Scudder.

MONTREAL BRANCH, Entomological Society of Ontario. — At the recent annual meeting the following have been elected officers for the ensuing year:

President—G. Chagnon.
Vice-President—C. Stevenson.
Librarian and Curator—A. E. Norris.
Treasurer and Secretary—George A. Moore, 24 Lorne Ave., Montreal.
Council—Henry H. Lyman, A. F. Winn, Dwight Brainerd.

PYRAMEIS CARDUI.

SIR,—Never since I first came to this country in 1893 have I seen any species of butterfly in such abundance as *Pyrameis cardui* is at the present time. During 1893, 1894 and 1895 I don't think I saw a single specimen, though these years seemed particularly favourable to most species. For the past year or two it has been rather common, and I have frequently found the larva on thistle during June. Locally-bred specimens were rather more common than usual last fall, and the same brood (presumably) appeared here with early spring. On May 12th I remarked upon their scarcity, and supposed they had died off, but for the last week they have been getting gradually more numerous, and to-day their numbers appear to have suddenly doubled, if not trebled. I believe I could net a thousand in a day without much difficulty. They do not seem to be travelling in any particular direction, but are evidently a "flight," probably from the South. I have watched the ♀ ♀ settling on a variety of seedling plants, presumably ovipositing, and in one instance found an egg on sage, and apparently no thistles near.

May 25, 1901. F. H. WOLLEY DOD, Calgary, Alberta.

BOOK NOTICES.

MONOGRAPH OF THE SESIIDÆ OF AMERICA, North of Mexico.—By William Beutenmüller. Memoirs of the American Museum of Natural History, New York. Vol. I., Part vi., pp. 215-352. March, 1901. (Price, $5.)

In this sumptuous quarto the author has brought together in complete form the results of his studies of the Clear-winged Moths of North America. In arrangement, style and completeness, the work leaves nothing to be desired. The family is divided into 17 genera, each of which is fully characterized and illustrated by a drawing showing the head, hind leg, venation, and in some cases the anal appendages, of a typical species. With each species is given a very full bibliography as well as descriptions of both sexes and the larva, when known, followed by general notes mentioning resemblances to other species, particulars regarding habits, food-plants, distribution, etc. There are also synopses of genera and species, larval food-habits and of the described larvæ, rendering the work easily available for reference and the identification of species. The work

concludes with an amazing bibliography which fills thirty-six pages and includes 542 titles. This by itself would show the industry and thoroughness of the author and the pains he has taken to render his monograph as perfect and complete as possible. Besides the four and twenty carefully-drawn wood-cuts already referred to, the work is illustrated with eight splendid coloured lithographic plates, on five of which are depicted about 130 figures of the perfect moths, and on the remaining three, specimens of the destructive work of the larvæ in the trunks, limbs and roots of trees and other plants. We heartily congratulate the author on the successful completion of this grand work, and hope that he may be able from time to time to present to the scientific world similar volumes dealing with other groups and families of moths, many of which sorely need the careful revision of a competent monographer. C. J. S. B.

THE INSECT BOOK: A popular account of the Bees, Wasps, Ants, Grasshoppers, Flies and other North American Insects, exclusive of the Butterflies, Moths and Beetles, with full life-histories, tables and bibliographies.—By Leland O. Howard, Ph. D. New York: Doubleday, Page & Co., 34 Union Square. One Vol., small 4to., pp. xxvii. + 429. (Price, $3 net.)

Only last month we noticed Dr. Howard's book on Mosquitoes, and now we have before us a larger and more important work by the same author. It forms one of the series of "Nature Study" books, and is consequently uniform in size and style with Dr. Holland's "The Butterfly Book." The author describes in the title the scope and intention of the work. He does not profess to cover the whole insect world, as Dr. Holland is preparing to deal with the Moths as he has already done with the Butterflies, and Dr. Howard looks to someone else to undertake a popular work on the extensive order of Beetles.

As stated at the outset, the book is meant to be "popular," and therefore does not attempt the impossible task of describing all the insects belonging to the various orders treated of; at the same time, it does give full and interesting accounts of a very large number of species, and relates in an easy and agreeable manner all that the ordinary enquirer will wish to know. Any observant person who picks up an insect that he has not seen before, and wonders what it is and how it lives, will find an answer to his questions here. In most cases he will find an accurate picture of the specimen he is examining, and with very little trouble he will learn all he

wants to know. It is a book that will charm the young people, who are usually such keen-eyed naturalists; it will delight the collector of insects who is beginning the hard study of entomology; and it will be found of daily use by those who apply themselves to the pursuit of the economic side of the science, and who therefore require to know something about all sorts and conditions of insect life. We bespeak for it a wide circulation, and we hope that it will lead many a student and collector to devote himself to the less popular orders of insects, now that his way is made so much easier and he has such an effective help for the identification and classification of his specimens.

The volume is illustrated with 48 plates from photographs of the insects themselves. Twelve of these are coloured, and they are all so clear and so beautifully printed that they can be examined with a magnifying glass in order to observe the details. There are also 264 illustrations in the text, some, of course, familiar, but many new, and all well and carefully drawn. We are especially pleased to notice that the figures on the plates are clearly numbered in regular order, so that there is no need of hunting over the page to find a number wanted, and the list of names faces the picture and saves the necessity of turning over a page to discover the titles of the insects depicted. C. J. S. B.

NATURE BIOGRAPHIES: The lives of some everyday Butterflies, Moths, Grasshoppers and Flies.—By Clarence Moores Weed, D. Sc. New York: Doubleday, Page & Co. One Vol., pp. 164. (Price, $1.50 net.)

We are glad that Dr. Weed has brought together in book form this series of studies of insect life and has illustrated them so fully and so beautifully with his own exquisite photographs. Some of them we read originally in the pages of newspapers, where they could not be illustrated, but they were nevertheless full of charm and interest. Now that they are published together, and have 150 of the most clear and perfect photographic illustrations that we have ever seen to illuminate them, we are sure that nature-lovers will read them with supreme delight. There are fourteen of these studies—too many to enumerate here, but we may mention particularly those entitled: The Making of a Butterfly, The American Tent-Caterpillar, The Camera and the Entomologist, and

Insects in Winter. Not that these are more noteworthy than the rest, but they will serve to give an indication of the contents of the work.

Dr. Weed's "Stories of Insect Life" have been much appreciated, and we are sure that his "Nature Biographies" will be still more enjoyed, and will lead many, old as well as young, to observe for themselves some of the wonders of the insect world—some of the marvels that every day surround us. C. J. S. B.

Mr. P. Wytsman (108 Boulevard du Nord, Brussels, Belgium) has issued the prospectus of a proposed elaborate and important work, viz., "Genera Insectorum" of the world. It is to be issued, provided one hundred subscribers can be secured, in quarto parts, each containing about 72 pages of text, and 7 plain or coloured plates. The price of each part will be five dollars, and it is expected that 75 parts will be required to complete the work. It is hoped that well-endowed libraries, both in Europe and America, will render the publication practicable; it is far beyond the means of all but very few individuals.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The annual meeting will be held at Denver, Colorado, August 24th to 31st, where it is expected that there will be a large attendance of members from all parts of the continent.

The thirteenth annual meeting of the Association of Economic Entomologists will be held at the same place, beginning at 10 a.m. on Friday, August 23rd.

The editor desires to thank some unknown correspondents for sending him (1) a pair of *Attacus promethea* and cocoon, and (2) a specimen of the rare Sphinx moth, *Triptogon modesta*. He would remind correspondents that it is in all cases desirable to place upon the outside of a package the name and address of the sender, as postmarks are frequently illegible, and it is not always possible to identify handwriting.

LOCUSTS IN FRANCE.—An English newspaper correspondent relates that these pests have been damaging vines, clover and oats in several departments. Owing to the invasion of the locusts, the Government has directed a committee of scientific agriculturists to meet at Arles for the purpose of concerting measures to keep off the plague from the infested districts. The place which has most suffered is the marshy and unhealthy district in the Bouches-du-Rhone, known as the Camargue.

Mailed August 3rd, 1901.

Coccidæ Americanæ.

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Annual Reports.—1871 and 1872 are out of print; other numbers can be supplied at 50 cents each, except the 8th and 9th, which are one dollar.

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The Canadian Entomologist

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No. 9.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

SEPTEMBER, 1901.

LONDON:

LONDON PRINTING AND LITHOGRAPHING COMPANY.

1901.

WANTED.—A young man to act as secretary and assistant in entomology. Address, stating qualifications: HENRY H. LYMAN, 74 McTavish St., Montreal.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. Y. B. A. L. LEYMARIE, 25 Voyer Lane, near Rachel Street, Montreal, P. Q

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19*b*, 20, 23, 25*d*, 25*g*, 25*h*, 34*b*, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

ACULEATE HYMENOPTERA, especially Apoidea, wanted. Will give good exchange in Coleoptera or Hymenoptera. E. S. G. TITUS, Urbana, Ill.

LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

WANTED.—Cicindelidæ, Carabidæ, and rare Scarabaeidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelpha.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.



MISS ELEANOR A. ORMEROD, LL. D., F. R. MET. SOC.
HON. MEMBER ENT. SOC. ONTARIO, ETC., ETC.

The Canadian Entomologist.

VOL. XXXIII. LONDON, SEPTEMBER, 1901. No. 9

MISS ELEANOR A. ORMEROD.

Entomology in England has suffered a great loss through the death of this talented and estimable lady, who died at her residence, Torrington House, St. Albans, on Friday, July 19th. Practical entomologists throughout the world are moved with profound regret that a career so remarkable and so useful should be brought to a close, but one could hardly hope that the aged lady would long be able to sustain the burden of increasing infirmities and the trials of a painful and protracted illness.

Miss Ormerod was born at Sedbury Park, Gloucestershire, on May 11th, 1828, and had thus entered upon her 74th year. She was the youngest of a family of ten, seven of them sons, all of whom she survived. Her father, Mr. George Ormerod, LL. D., F. R. S., F. S. A., etc., was a distinguished literary man and the author of a notable "History of Cheshire"; her mother was a daughter of Dr. John Latham, F. R. S., at one time President of the College of Physicians. On both sides, therefore, she inherited literary and scientific tastes, and at an early age displayed a love for natural history and outdoor pursuits. As her father became advanced in years, it devolved upon her to take a large share in the management of his estates, which included a home-farm, and in this way, no doubt, she was led to give the practical turn to her entomological investigations which caused them to be of so much public value afterwards. She also when quite young took an interest, that she continued to maintain throughout her life, in meteorological observations, and in course of time published "The Cobham Journals" of meteorological and phenological records made by Miss Molesworth at Cobham in Surrey. She was the first lady to be admitted as a Fellow of the Royal Meteorological Society, as she was also the first lady to receive (last year) the honorary degree of Doctor of Laws at the University of Edinburgh. Among other honours bestowed upon her may be mentioned the Silver Medals of the Société Nationale d' Acclimitation of France and the Royal

Horticultural Society of England; the Gold Medal of Honour and two Silver Medals from the University of Moscow; and Honorary Membership in many Scientific Societies both in Europe and America.

Among her entomological publications may be mentioned the "Manual of Injurious Insects," 1881; "Guide to Methods of Insect Life," 1884; "Injurious Insects of South Africa," 1889; "A Text-book of Agricultural Entomology"; and the long series of "Annual Reports of Injurious Insects and Common Farm Pests," from 1878 to 1901. The last of these Reports, the twenty-fourth volume, we noticed in the May number of this magazine, and gave some account of their great practical value and the wide range that they cover.

Miss Ormerod was one of the most remarkable women of the latter half of the nineteenth century, and did more than any one else in the British Isles to further the interests of farmers, fruit-growers and gardeners, by making known to them methods for controlling and subduing their multiform insect pests. Her labours were unwearied and unselfish; she received no remuneration for her services, but cheerfully expended what means she possessed in carrying out her investigations and publishing their results. We know not now by whom in England this work can be continued; it is not likely that any one can follow in the unique path laid out by Miss Ormerod; we may therefore cherish the hope that the Government of the day will hold out a helping hand and establish an entomological bureau for the lasting benefit of the great agricultural interests of the country. C. J. S. B.

ON TYPES OF ACRONYCTA, ETC.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

The following comments upon Prof. Smith's paper in CAN. ENT. for Nov., 1900, 333, have suggested themselves to me. The types of *Acronycta* there discussed are the specimens in Brit. Mus. Coll., and in several instances my determinations are now adopted by the author.

A. pallidicoma, Grote.

This name is cited without comment, except that the type is a small female (334). It would have been more to the point if this name had been identified with one of the "two series into which *xyliniformis* allows itself to be so prettily divided" (Sm. and Dyar, p. 149). Whether as applied to a form or a species, the name is valid. It is not *xyliniformis* as

identified by me, nor did I ever determine this species as *spinigera*, so that the reference (l. c. 167) to my "lists and collection" is erroneous. I named originally *xyliniformis* for Prof. Riley, who published it in the Missouri Reports.

A. impressa, Wlk.

I had previously, after seeing types, considered *impressa*, *fasciata* and *Verrilli* as referring to one identical species. I did not, however, originally determine this species as *brumosa*. I took the, as it now appears, erroneous identification from Mr. Morrison, to whom it should be credited. I only knew *brumosa* from Guenée's description, which I could not myself identify. Mr. Walker's descriptions were quite unintelligible to me, and there was no guarantee that they referred positively to species of *Acronycta* at all.

A. brumosa, Guen.

After referring my *subochrea* to this, the name, following Mr. Butler, is now identified with *persuasa*. It has always seemed improbable to me that this latter Southern species should have been intended by Guenée, and I should not drop a well-founded name on the chance. Probably when Guenée's types, Coll. Oberthür, are examined, these names may be changed back again, and I should advise students to retain *persuasa*. Later on, in the same paragraph, the author says that Mr. Butler "was correct in uniting *brumosa* and *superans*." If so, Mr. Butler must have made another mistake. Indeed, it cannot well be that *brumosa* is both *persuasa* and *superans*. What *brumosa* really is, is hardly settled by the specimen in Brit. Mus. Guenée told me in 1867 that he had many of his types, and showed me several in separate glass boxes, comparing them with what specimens of *Acronycta* I had brought with me to Chateaudun. Guenée stated at the same time that he had returned other specimens (in some cases the cotypes, as I understood) to Doubleday. Guenée's specimens, Coll. Oberthür, must be gone over before his names in this genus can be finally decided upon.

A. subochrea, Grote.

This name is now validated, as I contended it should be.

A. impleta, Wlk.

I have not the Brit. Mus. Cat. at the moment to again refer to, but I believe this name was founded upon a fragment, hind wings and body

wanting. The description is thus additionally useless for identification, and the name so founded should be dropped.

A. hamamelis, Guen.

This identification was given us by Guenée. It now seems probable that Guenée had "mixed up" the species, and that "a very dark form of what we call *hamamelis* being easily confounded with *afflicta*," Guenée sent an *afflicta* to Doubleday and kept his other type, a dark *hamamelis*. The rule would then in any event validate *afflicta* as being properly differentiated. The two species would stand:

1. *A. afflicta*, Grote.
 = *A hamamelis*, Guen., in pars (spec. as type in Coll. B. Mus.).
2. *A. hamamelis*, Guen., in pars (spec. in Coll. Guen.).
 = *A. inclara*, Sm.

It would prevent much confusion if the names as above were retained.

A. haesitata, Grote.

This name is now validated. It was evidently owing to my remark in *Psyche* that Sm. and Dyar positively made the name a synonym of *clarescens*. I then admitted the possibility, referring to Mr. Butler's identifications, that *clarescens* might have been founded on a large pale *hamamelis* (= *inclara*). This brief characterization covers very well and suggests my *haesitata*.

A. clarescens, Guen.

The identification of this species by me in American collections is now validated. Guenée, at the time, in comparing his type with my material, was a little doubtful. But I thought, on the whole, that he was satisfied with the determination, so I adopted it and labeled my example.

A. increta, Morr.

I wish to say here that any jumbling of the species in Coll. B. Mus. is not my work. The rearrangement of Mr. Walker's material is the work of Mr. Butler, whom Mr. Tutt, and, indeed, Prof. Smith as well, has criticised for his want of familiarity with the Noctuidæ. Mr. Walker had no type labels. The sorting out of specimens as his "types" is therefore uncertain at Mr. Butler's hands, especially in the cases which occurred where more than one species was placed by Mr. Walker over one printed label. The

determinations made by myself and Mr. Robinson, and later by Prof. Fernald, before the Walker collection was meddled with, are entitled to credit. In other cases we must fall back on the description in the B. M. Cat., bad as this may be. Anything which contradicts a supposed identification should be sufficient to overturn it, no matter what the so-called "type" may be.

A. exilis, Grote.

I am glad this form, or species, is at last differentiated and that the correctness of Mr. Butler's earlier remarks is vindicated.

A. insolita, Grote.

The type was not originally a "very poor" specimen. After description it became entirely greasy, and I bathed it in ether, which gave it a somewhat crumpled look. The original colour and marks came out again, however; the blackish general hue, against which the gray marks of the t. p. line clearly contrast, could not suggest to me *lanceolaria*. However, the mystery about this species may be now on its way to solution. The name is in any event valid, if applied to a black form of *lanceolaria*.

In the present paper, I refrain from any discussion on the generic titles as to which I am at variance with Smith and Dyar.

Assuredly, types must look typical, and certainly some of the British Museum so-called types of Walker and Guenée do not look so, for which there is the best of reasons. They have partly been sorted over and made into types, or they have been mistakenly labeled, or the labels were mere determinations of the species not having the force of types. The specimens of *Acronycta* may include all these categories. As the Guenée labels are not final until Oberthür's collection is examined, what I conclude is, that the changes, back and forwards, proposed by Prof. Smith, are tentative merely. It is wrong to consider them authoritative or conclusive, for the determinations in Smith and Dyar's "Revision of *Acronycta*" are put forward in a positive manner, and now they are equally positively contradicted by Prof. Smith. It would have been well, as it turns out, if my original determinations had been let alone. As it seems, I understood the species of N. Am. *Apatela*, generally speaking, sufficiently well. The new, mostly Western species, could have been properly added and the "Revision" bided its time.

CYPHODERRIS MONSTROSA.

BY LOUIS W. TURLEY, UNIVERSITY OF IDAHO.

Some time ago, I read a very interesting article, by Dr. S. H. Scudder, in the CANADIAN ENTOMOLOGIST, on *Cyphoderris monstrosa.* The rarity of the insect, as set forth by Dr. Scudder's article, has led me to write the observations, of myself and others in this section, on an Orthopteran identified by Professor Aldrich and Professor Bruner as the above-named insect.

In June of 1899, while walking through a pasture near Moscow, at dusk one evening, I heard a great many short, intermittent chirps, similar to the song of *Oecanthus fasciatus;* but more subdued and ventriloquial, and with longer pauses between the measures. I supposed them to be the songs of crickets, but never before having heard songs like them, I decided to make an acquaintance with their authors.

Carefully I followed first one and then another to its seeming source, when, will-o'-the-wisp-like, it would be somewhere else. I began to think that perhaps they were birds, and that when I came too near they would run elsewhere, for, once having ceased, no more sound came from that spot, even though I moved away and remained quiet for some time. But at last I traced one which continued to sing, although I was but a foot or two from it. I looked cautiously and carefully about, but noticed only what appeared to be the empty capsule of a fleur-de-lis of last year. The song continued. I listened. Yes, that was the place. There was no mistake. It was only a foot or so from my ear. Seized by a burning curiosity to know this spirit songster, I quickly struck a match. At the appearance of the light, the supposed capsule began slowly to move down the dry stem. I could not make out just what it was. It did not appear like a cricket; besides, a cricket would have hopped instead of slowly crawling. But what else sang that way but an Orthopteran? However, there was no time to lose, he was almost to the grass. I had nothing to put him in, but could not afford to allow him to escape, so grasped him.

He took his capture as a matter of course, making no struggle to free himself. Elated by my success, I decided to push my conquest farther, and, after waiting and listening for about half an hour, I captured another. They lay perfectly still in my hand. I took them to my room, put them in a tumbler and lighted a lamp. They did not seem to like

the light, but crawled about trying to find an egress. Whenever they met they fought ferociously, like two cats, one or both lying down, kicking and biting. After some time I separated them, and they sang to each other the remainder of the night.

The next evening I again visited the field just after sundown, and found several specimens crawling up posts, strong grass-stems and other objects which would allow them to get several inches above the ground. While singing, the male stands head downward, several inches to a foot above the ground, on any object sufficiently high, in the meadow. In this position, presumably to facilitate their escape when disturbed, being slow of motion, they stridulate with their short, broad, round-pointed, parchment-like wings. Their song, as I said before, consists of short, subdued yet distinct measures, intervened by long pauses.

Although I found a great many of them in that, as well as similar places, I found only males. Professor Aldrich also searched, with the same success as I. No females have been seen in this vicinity. They did no apparent damage, so we thought no more about them until this spring, when Professor Aldrich received a letter from Mr. Stanley, of Cœur d' Alene, Idaho, complaining of great damage done to fruit trees by a peculiar cricket. Mr. Stanley sent us specimens of his persecutors, and, on opening the box, we were surprised to recognize our old friend, *C. monstrosa*, but contrary to our captures, all the specimens sent us were females.

In Mr. Stanley's letter dated May 23rd, 1901, he says: "They all live in holes in the ground during active service, which is in the spring, as soon as the flower-buds of the peach and cherry begin to open, until June. They prefer the above-named fruits to any other, but are destructive to apples and pears—in fact, nothing in the fruit line escapes them, and they do not seem to eat anything else when a fruit tree is in the vicinity.

"The great problem is to kill them when the peach and cherry trees are in bloom, for if they are left unmolested at that time they will so ruin the fruit-buds that the crop will be severely injured on large trees of all kinds, and entirely destroyed on those five and six years old."

Mr. W. W. Yothers, Horticultural Inspector for northern Idaho, visited Mr. Stanley. He said that the most destructive visit of the crickets lasted about three weeks during May. He also says that the

most successful means of combating them, as so far ascertained, is to spread sheets under the trees at night, and shake the crickets on to them. Mr. Stanley fed the crickets gathered thus to the chickens, who devoured them greedily. At this writing, we have not heard of *C. monstrosa* from any other section, except those mentioned by Professor Scudder.

AN ANTIDOTE TO INSECT-BITES.

BY CHARLES STEVENSON, MONTREAL.

During a trip to Paraguay to study the mosquito pest, Prof. Voges, the Director of the National Board of Health at Buenos Ayres, accidentally discovered a remedy for mosquito bites. He had a supply of all kinds of substances, among which was *naphthalene*, a chemical of no use whatever against the mosquito itself. A surprising result was produced on rubbing this chemical on mosquito bites. Even when the part stung was greatly inflamed, it had the effect of neutralizing the insect-poison. By rubbing it on the spot immediately after a person has been bitten, the swelling that usually follows does not arise.

Soon after hearing of the above remedy, I suggested, more in fun than in earnest, to a person who was being tortured by flea-bites, to rub them with a naphthalene or "moth" ball. Almost instant relief came after a good rubbing of the lumps raised by the bite, with a permanent disappearance of the painful irritation that generally lasts so long.

Personally, I have found "moth" balls a ready relief for the bites of gnats, and also the larger Diptera, as well as mosquitoes. A "moth" ball is such an easy thing for a person to carry round with him that it is well worth the trial of all entomologists on any stings or bites they may receive during any of their excursions. To get good results the "moth" ball must be well rubbed on the affected part for a few minutes.

Most entomologists use this chemical in the form of cones or balls for the protection of their collections. But I get better results from using it in its crystalline form, sprinkled in the cases now and again. It is entirely volatile when it is in its pure state, and the purest commercial quality is the crystalline and should leave no residue on evaporating in the cases. It not only keeps out insect mites, but also prevents mould, destroys bacteria and schizomycetes, and, being neutral, it has no reaction on paper or colours of the insects. But, most important to the user, it is not poisonous to man.

ON SOME GENERA OF STAPHYLINIDÆ, DESCRIBED BY THOS. L. CASEY.

BY E. WASMANN, S. J., LUXEMBURG.

1. In his *Coleopterological Notices*, V., p. 594, Mr. Casey described a new genus of *Aleocharini* under the name of *Myrmobiota (crassicornis*, Cas., n. sp.) as allied to *Homœusa*, Kr. The only specimen was captured at Iowa City (Iowa) by Mr. H. F. Wickham. Some time afterwards I received three specimens of an insect very like our *Homœusa*, under the name of *Myrmobiota crassicornis*, Cas., one directly from Mr. Wickham (captured at Iowa City, June 6, 1896), two through the kindness of Rev. P. J. Schmitt (captured by Wickham at Iowa City, bearing Wickham's number, 9561). After having compared this species attentively with our *Homœusa acuminata*, I could not doubt that it belonged to the same genus as the latter. I published a note on this subject in the *Tijdschrift voor Entomologie*, XLI., 1898, p. 11, declaring *Myrmobiota* to be the same genus as *Homœusa*.

Meanwhile, Mr. Casey described in *Journ. New York Entom. Soc.*, VIII., No. 2, June, 1900, p. 53–54, two new genera allied to *Homœusa* and *Myrmobiota*: *Soliusa* and *Decusa*. As to my identification of *Myrmobiota crassicornis* with *Homœusa*, he suggested Mr. Wickham might have sent me a *Soliusa* under the name of *Myrmobiota*.

Not knowing yet this last paper, which Casey kindly communicated to me later, I had sent him a typical specimen of our European *Homœusa acuminata* without indication of locality, and asked him whether this species was not a *Myrmobiota*. But he answered it seemed to be a true *Homœusa*, as it was indeed.

After having studied the comparative description of the genera *Homœusa*, *Myrmobiota*, *Soliusa* and *Decusa*, and having compared it with my specimens, I can give the following explanation:

(*a*) The three specimens of "*Myrmobiota crassicornis*," from Mr. Wickham, in my collection are indeed *Soliusa crinitula*, Casey, as Mr. Casey has suggested.

As to the value of Casey's three new genera allied to *Homœusa*, the following is my opinion:

(*b*) *Decusa*, Cas. (*expansa*, Lec.), is certainly a good new genus, having 10-jointed antennæ (*Homœusa*, *Soliusa* and *Myrmobiota* have 11-jointed antennæ), besides other differences; it was quite necessary to

create a new genus for *Hom. expansa*, Lec., and I fully agree with M. Casey on this point.

(*c*) *Soliusa* cannot be divided generically from *Homœusa*.

(*d*) *Myrmobiota* cannot be divided generically from *Homœusa*.

(*ad c*) The only *important* differences between *Soliusa* and *Homœusa* are: The two basal tergites narrowly and deeply impressed in *Homœusa*, not impressed in *Soliusa*; the basal joint of the posterior tarsi nearly (or fully) as long as the next two combined in *Homœusa*, distinctly shorter than the next two combined in *Soliusa*. The first difference is no generic one, but only a specific one; the second is sometimes a generic, sometimes only a specific difference [*e. g.*, in *Lomechusa mongolica*, Wasm., the first joint of the posterior tarsi is nearly twice as long as the second and twice as broad; in *Lomechusa strumosa*, F., it is only very little longer and scarcely broader than the second; similar differences exist also between *Atemeles pubicollis* and *paradoxus*, and between *Myrmœcia (Nototaphra) lauta* and *lugubris*, Cas.]. If no other important differences *join* themselves to this one, it cannot be regarded as a generic, but only as a specific, difference.

(*ad d*) The only *important* differences between *Myrmobiota* and *Homœusa* are the thickness of the antennæ, the form of the thorax, and the relative length of the basal joint of the posterior tarsi, the latter difference being the same as between *Soliusa* and *Homœusa*. I refer to the above exposition. As to the thickness of the antennæ in *Myrmobiota*, this character may be only of specific value, if no other important differences are joined to it (cf. the different specific thickness of antennæ in the genus *Myrmedonia*, Er., or in the genus *Philusina*, Wasm.). As to the different form of the thorax, its sides being nearly parallel towards the base and with rectangular basal angles in *Homœusa*, evidently contracted towards the base with obtuse basal angles in *Myrmobiota*, the posterior margin being distinctly sinuated in *Homœusa*, not visibly sinuated in *Myrmobiota*, this difference *could* be a generic one if it were connected with other important differences; but it can be also merely a specific difference. This seems to be confirmed by the fact that the sides of the thorax are distinctly *converging* towards the base in some of my specimens of *Homœusa acuminata*, *parallel* in others. We must not forget that the form of the thorax is often *widely different* in different species of the same genus of myrmecophilous Aleocharini; cf. *Atemeles emarginatus*, Payk., and *paradoxus*, Grav.; *Lomechusa strumosa*, F., and

mongolica, Wasm. Between the last-named two species the sides of the thorax and the form of the posterior angles differ just as between *Myrmobiota* and *Homœusa*; in the first-named two species it differs even *more*.

Therefore, I conclude, if we accept the differences between *Homœusa*, *Soliusa* and *Myrmobiota* with Mr. Casey as *generic* ones, we would be obliged to create *new genera* for most of the "*good species*" among *Lomechusa*, *Atemeles*, etc. But this system cannot be adopted, because the number of genera would increase *ad infinitum* without necessity. I prefer, therefore, to consider *Myrmobiota crassicornis* and *Soliusa crinitula*, Cas., as *good species* of the old genus *Homœusa*, Kraats.

The host of *Soliusa crinitula*, with which Mr. Wickham found my specimens, is *Lasius americanus*, Em., a race or variety of *Lasius niger*, L., with which our European *Homœusa acuminata*, Mærk., is living. I have also a specimen of *Soliusa crinitula*, found by Prof. W. M. Wheeler with *Las. aphidicola*, Walsh, at Colebrook, Conn.

2. In the same paper (Journ. New York Ent. Soc., VIII., n. 2, 1900, p. 55) Mr. Casey creates the new genus *Chitosa* for *Dinarda nigrita*, Rosenh., living with *Stenamma (Aphœnogaster) testaceopilosum* in the Mediterranean region. I had *D. nigrita* in my collection already, long ago, and intended to describe it as a new *sub-genus* of *Dinarda*, the peculiar form of the ligula being quite identical with *Dinarda Hagensi*, *dentata*, etc. But I must confess that the extraordinary structure of the basal joint of the posterior tarsi, which Casey has described very well, is a sufficient character for a new *genus* sensu stricto, the more as it is connected with other important differences in the structure of the antennæ and of the prothorax.

The last four joints of the posterior tarsi in *Chitosa* seem to be in a process of *degeneration*, which would conduct finally to the very extraordinary form of the tarsi as described in the genera *Sympolemon*, Wasm., and *Doryloxenus*, Wasm. (Congo and S. Africa). It would be very important to know if *Dinarda clavigera*, Fauv. (Revue d'Entom., 1899, p. 33), from Abyssinia belongs also to *Chitosa*.

3. In his *Coleopterological Notices*, V., p. 321 and 327, Mr. Casey described a new genus of Aleocharini, *Nototaphra*, allied to *Myrmedonia*, Er. One of the two species of this genus, *Nototaphra lauta*, Cas., had been sent to me by Mr. E. A. Schwarz and Mr. Theo. Pergande as a new species found with *Tapinoma sessile*, Say, in Massachusetts by Mr.

Blanchard. Not knowing its identity with *Nototaphra lauta*, Cas. (1893), I had redescribed it in my "*Kritisches Verzeichniss*" (1894, p. 74 and 206)under the name of *Myrmœcia picta*. In comparing it with our European *Myrmœcia plicata*, Er., and *Fussi*, Kr., I found not the slightest generic difference. Also, Casey's description of *Nototaphra* coincides with that of *Myrmœcia*, Rey. Even the sexual differences—the males bearing large tubercles on certain dorsal segments of the abdomen, a very characteristic mark of *Myrmœcia*—are also present in *Nototaphra*. Therefore, *Nototaphra*, Cas., is a *synonym* of *Myrmœcia*, Rey., and my *Myrmœcia picta* must bear the name *Myrmœcia lauta*, Casey.

Also, some other new genera of Staphylinidæ described by Mr. Casey may prove to be identical with older European genera by and by. In faunas of so near a relation as the palearctic and nearctic, it is very difficult indeed to find out all generic affinity immediately; this is no reproach, therefore, to Mr. Casey's study. A good many of his new genera will prove really distinct from our European forms.

THE LIFE-HISTORY OF NANNOTHEMIS BELLA, UHLER.

BY R. WEITH AND J. G. NEEDHAM.

1. *Field Observations on the Habits of the Species*, by R. Weith.

Nannothemis bella, Uhl., is one of the smallest of dragon-flies. Of its life-history we have had no knowledge up to the present time. Until the publication of Williamson's Catalogue of the Dragon-flies of Indiana, last year, it was recorded only from our north-east Atlantic seaboard. I have frequently met with it in Elkhart and St. Joe Counties, the two northermost counties in Indiana; but, what has been most perplexing to me, only in a few very restricted areas, these areas not exceeding 50 yards in length by 25 yards in width from margin of lake. The only places I have met with it are at Simonton Lake, a distance of four and one-half miles from the City of Elkhart, Indiana, and Indiana and Baldwin Lakes, thirteen miles north-east of Elkhart, on the boundary line that divides Indiana from Michigan. In the latter place, on a smaller area than at Simonton Lake, the imago is very numerous. Frequent endeavors to find the species at other places where similar conditions prevail proved unsuccessful.

Unlike most other Odonata, the imagoes do not fly higher than a few feet above the ground, preferring to alight on the marsh grass and bask in the sunshine, where numerous small Diptera suitable for food hover over the little stagnant pools.

Professor J. G. Needham published in the CANADIAN ENTOMOLOGIST, Vol. XXXI., p. 69, 1900, a list of those of our native Odonate genera of which no nymphs were known, and spurred by his desire to obtain the nymph of Nannothemis, inasmuch as the imago is to be found here in abundance, I undertook in a systematic way the task of securing it for him. The time of emergence for imagoes of this species is, according to my records, June 6th to 25th; the period of flight continues until the end of July. I began my search on the 18th of April. Using a dragnet, I explored the shore and grass-fringed margin of the lake, near where the imago is found, but without success. These places yielded lots of other nymphs, but no Nannothemis. Then, collecting in those places in the marsh where the water is from one to three feet in depth among the rushes and sedges proved fruitless also. This convinced me that the home of the coveted nymph must be the almost dry marsh-land, with here and there a hole with a few inches of water in it. The holes were too small to allow the use of a net: I had to dip the water out with my hands. In them I was surprised to find a great number of Libellula nymphs, among which were two that proved to be the nymphs desired.

Not being able to find any more in these holes, I then searched thoroughly the debris which had been deposited on the marsh during high water, and which still lay in many places covered by a few inches of water. Here I found I could collect in an hour eighteen to twenty-five of them. But it was very trying on the collector, for the nymph of *N. bella* is the most sluggish insect I know of; Stratiomyia and Odontomyia larvæ, which are abundant in the same places, are race-horses in comparison. Removed from the water, the nymph clings closely to grass or debris of exactly its own colour, and does not stir even after letting this dry: so it is hard to see, and everything has to be picked over very carefully.

On June 22nd I found a number of females ovipositing, in the shallow places where I had found the nymphs, in temporary water one to two inches in depth and very warm. The female dips her abdomen to the surface, after the manner of all Libelluline, but only about three or four times, then rests on the grass a few minutes and then repeats.

The eggs are creamy-white, turning dark in a short time, with a scanty gelatinous envelope.

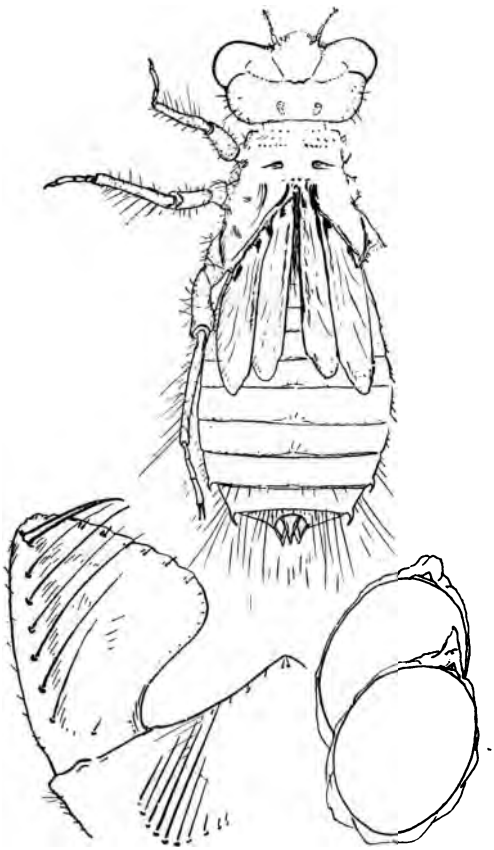


FIG. 8.

2. *Description of the Nymph*, by J. G. Needham.—Fig. 8.

The nymph, fully grown, measures in total length of body 10 mm.; abdomen, 5.5 mm.; hind femur, 3.5 mm.; width of head, 3.5 mm.; of abdomen, 4 mm.

Colour, almost uniform tawny yellowish-brown, paler below and on the sutures, more or less completely obscured by adherent vegetable debris. Body moderately hairy on lateral margins, especially hairy toward the end of the abdomen.

Head compact, one-third wider than long, scurfy, hairy above excepting a pair of bare spots near the hind margin, with prominent hemispherical eyes covering the antero-lateral angles, narrower behind the eyes, with parallel sides, rounded hind angles, and almost straight hind margin. Antennæ shorter than the head is long, 7-jointed, with scattering hairs along the distal joints. Labium extending posteriorly between the bases of the fore legs; median lobe broadly triangular, half as long as wide, rounded on tip, with two spinules close together just before the tip, and several others each side along the front border farther apart; raptorial setæ on the mentum, 10 each side, the fourth or fifth (counting from the side) longest, the three innermost ones quite small; lateral labial lobes ample, with six raptorial setæ, and a spinule at the base; hook straightish to the slender, slightly-incurved tip, hardly longer than the setæ, but much stouter; teeth almost obsolete, bi-spinulose.

Prothorax with prominent spiracles; legs hairy, especially the tibiæ externally; tarsal claws not strongly incurved; second tarsal joint one-half longer than the first, and the third one-half longer than the second; wings reaching well upon the 6th abdominal segment.

Abdomen somewhat depressed, oblong, widest on the 6th segment, the 9th segment as wide as the 2nd, narrowed with extraordinary abruptness on the 10th segment, which is almost included within the apex of the 9th. No dorsal hooks at all; in their places are tufts of a few long hairs, and whitish spots in the anteapical membrane of the segments. Lateral spines on segments 8 and 9, hooklike, starting outward at base, and incurved at tip, on 8 one-half the length of the segment, on 9 a little longer than on 8. Hairs on the apical carinæ well developed, especially so on segment 9, which they completely encircle, constituting a long fringe which completely overhangs the 10th segment and the appendages. Appendages about as long as the 9th segment is on its slightly shorter dorsal side, lateral appendages a third shorter.

Since the discovery and description of the nymph of *Tachopteryx Thoreyi*, Sel., by Messrs. Atkinson and Williamson, last year, this species has remained the most important discovery to be made. It is our only representative of that singular group of Libelluline genera which Karsch called the Nannophyæ*. Mr. Weith's zeal and industry have brought this nymph to light, and there now remain of all the genera of Odonata of the northern United States and Canada but two in which no nymphs are known, and they are *Gomphæschna* and *Micrathyria.*

*Ent. Nachr., vol. xv., pp. 245-263.

A NEW GENUS IN THE CŒLIXINÆ.

BY E. S. G. TITUS, URBANA, ILLINOIS.

Chrysopheon, new genus.

General shape and appearance of an *Epeolus*; labrum very long, rounded transversely, labial palpi 4-jointed, *first joint longest*, third and fourth subequal; maxillary palpi 2-jointed, second joint longest and tapering, maxillæ long, sickle-shaped and convoluted; scutellum with two short slightly-incurved spines, postscutellum produced medially into a short, sharp, upturned tooth; marginal cell rounded, not attaining the costa, *second sub-marginal cell longer than first, narrowed above; receiving both recurrent nervures*, claws bifid, inner tooth shortest, no pulvilli; abdomen convex, densely pubescent and banded, last segment of female bare, narrowed slightly and emarginate a very little at tip.

Differs from *Dioxys*, Lepel., by second sub-marginal cell longer than first, and by first joint of labial palpi being longer than second; from *Hoplopasites*, Ashm., by the colour of the abdomen as well as other characters; from *Biastes*, Panzer, by shape of abdomen and by palpal characters.

Chrysopheon aurifuscus, new species.

♀.—Black; pubescence golden-brown; head closely, confluently punctured, clypeus coarsely, closely punctured with an elevated smooth carina on its anterior edge; labrum narrowed near base and truncate at anterior end, confluently punctured, except at base, where it is longitudinally striate, striæ separate; mandibles black, bidentate with outside groove; face with rather long hair, occiput and cheeks with shorter hair; antennæ black; base of metathorax with a row of regular pits, much as in some *Colletes;* pubescence of dorsum of metathorax short; on pleura, scutellum and sides of metathorax longer, denser; wings clouded with a few hyaline spots; tegulæ reddish-testaceous, hairy, punctured, shining; stigma black; legs with sparse glittering golden-brown pubescence, tarsi reddish; first four dorsal segments of the abdomen with dense short pubescence, on apical margins heavier and forming distinct hair-bands; fifth segment with a narrow apical band, sixth segment bare, narrowed very slightly towards the tip, longer than wide and slightly emarginate at tip; first five ventral segments with strongly visible hair-bands, that on first narrower than others and all five segments sparsely pubescent with short hair; last segment smooth, rounded at tip, and shorter than the last dorsal segment; abdomen with close medium-sized punctures; ventrally the punctures are larger and more separate. Length 12 mm.

Habitat.—Colorado. Described from two females taken on Horse-tooth Mt., near Ft. Collins, altitude 7,500 ft., June 14, 1899, on *Monarda citriodora* and *Chrysop villosus*.

The types are in the collection of the Colo. Agr'l College.

Prof. Cockerell suggested to me that perhaps this was near *Melecta mucida*, Cress., and that that species might belong to the same genus. The type of *M. mucida* is in Acad. Nat. Sc. of Philadelphia. Mr. Vierick writes me from there that the mouth parts are entirely concealed.

NOTES ON THE GENUS OSMIA.

BY E. S. G. TITUS, URBANA, ILLINOIS.

The maxillary palpi of *Osmia* (sens. lat.) are given by most authors as *four-jointed.* I have examined the maxillary palpi of sixteen species in this group, and find in every instance that these palpi are *five-jointed.* The first joint is usually small, sometimes globular in shape, and visible with a hand-lens only under very favorable conditions. The following species were examined: From the coll. of the State Agr'l College of Colorado—*O. armaticeps*, Cr.; *Coloradensis*, Cr.; *dubia*, Cr.; *fulgida*, Cr.; *integra*, Cr.; *lignaria*, Say, and *mandibularis*, Cr., all from Colorado.



FIG. 9.

From the U. S. Nat. Museum—*O. abjecta*, Cr. (Calif.); *albiventris*, Cr. (Can.); *armaticeps*, Cr. (Colo.); *Californica*, Cr. (Calif.); *chalybea* (Fla.); *cobaltina*, Cr. (La.); *densa*, Cr. (V. I.); *distincta*, Cr. (Penn.); *dubia*, Cr. (Colo.); *lignaria*, Say (Kans., Ga.); *integra*, Cr. (Colo.), and *marginipennis*, Cr. (La.). From the collection of Mr. Wm. H. Ashmead —*O. Californica*, Cr. (Wash.); *chalybea* (Wash.); *cobaltina*, Cr. (La.); *distincta*, Cr. (Wis.). From Ohio University—*O. chalybea*, Sm., and *lignaria*, Say; also a few other specimens from various places—*O. chalybea*, Sm. (N. J.); *albiventris*, Cr. (Penn.); *lignaria*, Say (Wis., Penn.), and *megacephalus*, Cr. (Penn.).

I wrote to Prof. Cockerell regarding these facts, and under date of May 20, 1901, he replies: "*I hasten to assure you that Osmia has 5-jointed maxillary palpi.* * * * *To make the thing doubly sure, my wife and I just now examined the maxillary palpi of the following species, and they are all 5-jointed: O. lignaria, O. cornuta* (Europe), *O. phenax, O. albiventris, O. Kincaidii, O. brevis, O. calla, O. nanula.*"

I am under obligations to Prof. C. P. Gillette, for the use of the material in the coll. Colo. Agr'l College; to Mr. W. H. Ashmead, for the loan of specimens from the U. S. Nat. Museum, and from his own collection; to Prof. Osborn, for specimens loaned me from Ohio University collection; and to Prof. Cockerell and Mr. W. J. Fox, for determinations and other favours.

THREE NEW SPECIES OF CULICIDÆ.

BY D. W. COQUILLETT, WASHINGTON, D. C.

During his extensive investigation of the mosquitoes of this country, Dr. L. O. Howard encountered three apparently new forms, and in order that these may be referred to intelligently in his correspondence and otherwise, he has instructed the writer to name and characterize them in one of our entomological journals. The descriptions are therefore offered herewith:

Psorophora Howardii, new species.

Male.—Head black, upper half of occiput covered with appressed white scales, except a narrow median stripe, hairs black; first joint of antennæ yellow, second joint black, its extreme base yellow, the two terminal joints black, remainder of antennæ alternate black and whitish, the plumosity black changing to whitish at the tips; mouth-parts black, base of third joint of palpi yellow, palpi covered with violet-purple appressed scales, the last joint narrower than the preceding, tapering to the apex, its hairs sparse and very short, the penultimate joint and apical fifth of the preceding bearing many rather long hairs; body black, the humeri yellow, pleura and sides of mesonotum bearing many appressed white scales, abdomen on upper side covered with appressed violet-purple scales, those on the first segment and a few at the hind angles of some of the other segments white; wings hyaline, first basal cell much longer than the second, petiole of first submarginal cell subequal in length to the cell; femora yellow, the apices black and on the under side fringed with rather long, narrow, nearly erect scales, remainder of femora thinly covered with appressed violaceous scales; front and middle tibiæ yellow, their apices brown, thinly covered with appressed violaceous scales, hind tibiæ brown, the extreme bases yellow, covered with appressed violet-purple scales interspersed with many suberect brown ones; tarsi brown, the first joint, except its apex, and the base of the second yellow; claws

of front and middle tarsi very unequal in size, the anterior claw of each pair bearing two teeth, the other with a single tooth, claws of hind tarsi of an equal size, each one-toothed; halteres yellow, becoming brown at the apex.

Female.—Differs from the male as follows: Antennæ dark brown, the first joint and base of the second yellow, the hairs dark brown, palpi dark brown, the basal third yellow, bearing a few rather long hairs; hind tibiæ yellow, the apices brown, tarsal claws equal, each one-toothed.

Length, excluding the proboscis, 6 mm. Three males and one female, received from Dr. W. C. Coker, of the Johns Hopkins University. Type No. 5793, U. S. National Museum.

Habitat.—Hartsville, South Carolina.

This fine species is respectfully dedicated to Dr. L. O. Howard, whose investigations have so much increased our knowledge of the early stages and distribution of the members of this important family.

Culex Curriei, new species.

Head black, scales on lower parts of occiput white, on the upper part light yellow, usually a patch of golden-brown ones between, a few erect black scales and bristles on the sides, antennæ and mouth-parts dark brown, base of the former yellow; body black, scales of mesonotum light yellow, a median and usually a lateral vitta of golden-brown ones, those of the pleura white, of the abdomen yellowish-white, a pair of black-scaled spots on segments 2 to 5; femora and tibiæ yellow, brownish at the apices, covered with mixed yellowish-white and brown scales, tarsi brown, the front ones having the base and apex of the first two joints and base of the third, the middle with the base and apex of the first three joints and base of the fourth, the hind ones with both ends of the first four joints and the whole of the last one, whitish, all claws one-toothed; wings hyaline, scales of the veins mixed yellowish-white and brown, petiole of first submarginal cell about three-fourths as long as that cell; halteres yellow; length 4 to 5 mm. Five female specimens. Type No. 5798, U. S. National Museum.

Habitat.—University, N. Dakota (June, 1896; Mr. R. P. Currie, after whom the species is named); Colorado; Boise, Idaho (Mr. C. B. Sampson); and Palo Alto, Cal. (Nov. 8, 1900; Prof. V. L. Kellogg).

Near the European *C. dorsalis*, Meigen, but according to Theobald that species has simple tarsal claws.

Aëdes Smithii, new species.

Black, the pleura largely, venter, bases of halteres, coxæ and bases of femora yellow, scales of upper sides of body dark brown, some on the abdomen having a violaceous reflection, scales of femora black, those on the under side light yellow, scales of hind tibiæ black, those on the inner side and on the front and middle tibiæ and their tarsi light yellow, tarsal claws simple; wings hyaline, first submarginal cell nearly twice as long as its petiole; length 3 mm. Two males and three females bred from material received from Prof. J. B. Smith, after whom the species is named. Type No. 5799, U. S. National Museum.

Habitat.—Lahaway, New Jersey.

At the suggestion of the writer, Prof. Smith submitted specimens of this species to Mr. Samuel Henshaw, of the Museum of Comp. Zoology at Cambridge, Mass., for comparison with the type of *Aëdes fuscus*, and Mr. Henshaw replied that the two forms are very distinct. The new species will readily be recognized by the absence of cross-bands of yellowish scales at the bases of the abdominal segments.

BOOK NOTICE.

CATALOG DER LEPIDOPTEREN des Palæarctischen Faunengebietes von Dr. Phil., O. Staudinger und Dr. Phil., H. Rebel. Dritte Auflage des Cataloges der Lepidopteren des Europæischen Faunengebietes: Berlin. Friedlænder & Sohn, Mai 1901.

This is an old friend in a new dress, and yet the dress is not at first so different, for general arrangement, typography, method of citation, etc., are very much like those of the preceding edition. Part I., *Papilionidæ* to *Hepialidæ*, is by Staudinger and Rebel, and contains 411 pages, aside from the 30 pages of introduction and explanations. Part II., *Pyralidæ* to *Micropterygidæ*, is by Dr. Rebel, and contains 368 pages, which, however, include the generic and specific indices to both parts. That the work fully equals in all respects the previous edition goes without saying; it does even much more, and represents, though not fully, the intermediate progress in classification.

No one who has not met both authors can understand the real marvel of this combined work.

Dr. Staudinger, old, slow and conservative; utterly out of touch with modern methods; distrustful and suspicious of characters unfamiliar to

him ; positive in his convictions, with an almost unparalleled knowledge of species and the widest possible acquaintance with their distribution.

Dr. Rebel, young, active, prompt in decision and action; fully acquainted with modern methods and in full sympathy with them; appreciative of characters different from those traditionally used, open-minded, yet equally positive in opinion.

Two more divergent collaborateurs could scarcely be imagined, and the introductory remarks by Dr. Rebel show how slowly the work progressed and how nearly it was at times abandoned, owing to apparently irreconcilable differences of opinion. That it was the younger man who gave way in most cases appears plainly enough, and that in certain directions the catalogue would have been much improved had he had his way is also certain.

To mention one case only: the addition of the citation of the place of original description of the genera used, as desired by Dr. Rebel, would have improved the usefulness of the "Catalog" immensely for the general student.

The rules concerning nomenclature laid down in the second edition are approved and continued as a guide to the third edition.

The *Papilionidæ* at the beginning of the butterflies is familiar; but the term Rhopalocera is lacking, and after the *Pieridæ* we now have the *Nymphalidæ* instead of the *Lycænidæ;* which do not follow until after the *Libytheidæ* and *Erycinidæ*. The *Hesperiidæ* end this series as usual; but we have now only VII. Families as against X., with 74 genera and 716 species, as against 44 and 456 of the previous edition.

The term Heterocera is also abandoned, and series like "Bombyces" or "Noctuæ" have ceased to exist. Instead of that, VIII., *Sphingidæ*, follows without comment after VII., *Hesperiidæ*. It is a pity that in the *Sphingidæ* the Smerinthine series could not have been placed at the foot as the more generalized, rather than *Thyreus*, which is certainly more specialized.

Now comes an important change, when "IX. *Notodontidæ*," replaces the *Sesiidæ* of the former edition and so X. *Thaumetopoedæ* and XI. *Lymantriidæ*, are unfamiliar; though as *Cnethocampa* and *Liparidæ* we had been used to seeing them elsewhere. XII. *Lasiocampidæ*, XIII. *Endromidæ*, XIV. *Lemoniidæ*, XV. *Saturniidæ*, XVI. *Brahmaiidæ*, XVII. *Bombycidæ*, XVIII. *Drepanidæ*, XIX. *Callidulidæ*, XX. *Thyrididæ*, precede in order the XXI. *Noctuidæ*. These latter are divided into

Acronyctinæ, *Trifinæ*, *Gonopterinæ*, *Quadrifinæ* and *Hypeninæ*. All these have sub-family terminations; but under the rules generally accepted by American entomologists the terms *Trifinæ* and *Quadrifinæ* are improperly used for sub-families since there is no representative genus. These divisions represent a structural character.

The (XXII.) *Agaristidæ*, (XXIII.) *Cymatophoridæ* and (XXIV.) *Brephidæ*, precede the (XXV.) *Geometridæ*, which latter are divided into 5 sub-families.

Then come XXVI. *Uraniidæ*, XXVII. *Epiplemidæ*, XXVIII. *Nolidæ*, XXIX. *Cymbidæ*, XXX. *Syntomidæ* and XXXI. *Arctiidæ*, all in unusual sequence and in unfamiliar association: *Lithosiinæ* being degraded to sub-family rank.

Then come XXXII. *Heterogynidæ*, XXXIII. *Zygaenidæ*, XXXIV. *Megalopygidæ*, XXXV. *Cochliidæ* and XXXVI. *Psychidæ*, before at last we reach the *Sesiidæ* (XXXVII.), which lead to XXXVIII. *Cossidæ*, XXXIX. *Hepialidæ* and so to the end of Part I.

The *Hepialidæ* it will be noted are yet left among what are conventionally termed Macros, and not a hint of their association with the other "Jugatæ" is given.

Part II. is by Dr. Rebel alone and includes the series usually called Micros. They are divided into 18 families of very unequal extent, the first and most extensive being the *Pyralidæ* with 206 genera and 1,309 species distributed in 12 sub-families. *Pterophoridæ* come second and compared with our fauna are very well represented. The *Orneodeidæ* make family III., without any very obvious relation to the *Tortricidæ* which come after them and are distributed in three sub-families. Then come the Tineid series, as V. *Glyphypterygidæ*, VI. *Yponomeutidæ*, VII. *Plutellidæ*, VIII. *Gelechiidæ*, IX. *Tinaegeriidæ*, X. *Elachistidæ*, XI. *Gracilariidæ*, XII. *Lyonetiidæ*, XIII *Nepticulidæ*, XIV. *Taleporidæ*, XV. *Tineidæ*, XVI. *Crinopterygidæ*, XVII. *Eriocraniidæ* and XVIII. *Micropterygidæ*.

The importance of these departures in the new catalogue cannot be overestimated. "Staudinger" has been in such universal use in continental collections and has been so uniformly employed as a guide, that the system therein adopted had become crystallized. Now even the most conservative are forced forward a step, while to the novice who gets this new edition as his first guide, it will come as easily as the older order.

An excellent portrait of Dr. Staudinger forms the frontispiece, and is remarkably characteristic of the man as I saw him only a few weeks before his death. The last letter I received from him was in acknowledgment of a copy of my own "Catalogue of the Noctuidæ of Temperate North America," and in this letter he mentioned his readiness to start for that "Erholungsreise" from which he never returned alive.

JOHN B. SMITH.

CORRESPONDENCE.

A PROTEST.

SIR,—I very frequently read remarks in Entomological papers deploring the fact that the large and interesting Order of Hymenoptera has comparatively so few students! One of the chief causes is the continual changing of already-established names, the creating of new species where only slight resemblance exists or where determination is based upon one lone ♂ or ♀ only, and the frequent retracting of passed opinions by some authors, as is the case with Prof. Robertson in *Prosopis ziziæ*, Robt., in March number of Ent. News and CAN. ENT., May, 1896. Then again in CAN. ENT., Aug., 1901, such a lot of species and genera based upon imaginary (?) characters! What can one make of *Epeolus lectoides*, n. sp., based on one female "closely resembling *E. lectus*, Cr., and may be the same"? If an author cannot tell whether it is distinct or not, why name it? Again, "*Halictus truncatus*, n. sp.: This species and *H. arcuatus*, Robt., have both been identified as *H. similis*, Sm." *Chelostomoides*, n. g., proposed for a single species, "with general characters of *Megachile*." In Trans. Acad. Sc. of St. Louis, Vol. X., No. 2, the genus *Parandrena*, which has been proposed by him, is suppressed as needless. It remains to be seen whether the new genus *Paralictus*—CAN. ENT.—will fare better, and a few more instances which I will not mention. It is such work that is confusing, not to say disgusting, to a student like me.

R. J. WEITH, Elkhart, Ind.

ANOTHER PROTEST.

SIR,—I had been rather anxiously looking out for a further instalment of Mr. Hanham's list of Manitoban moths, as I wanted to compare notes about certain of the Geometers. It is just to hand, but when I

reached *Tephroclystis implicata*, etc., I threw it down in disgust. I fancy that almost every one the wide world over with any knowledge of entomology knows the old genus *Eupithecia*, or "Pugs" as we call them in England, but who outside a small circle of American pseudo-savants would know what is meant by the new name? What is a name in entomology? It is merely an arbitrary sign by which genera and species are distinguished one from another. To attempt to make entomology an exact science like mathematics seems to me the height of human folly. An injurious species will not be rendered less harmful by transfer from a genus in which it has quietly reposed for many years and become well known, into another genus and under another name. America does not constitute the whole of the world. There are other countries and other entomologists, although they do not stand out so prominently as do the Americans, the latter having been forced into activity by the peculiar natural conditions that here obtain, and which are not in force in Europe.

There seems to be a class of savants here who, to the honour and glory of themselves, and to the confusion of every one else, are endeavouring to upset everything that has been previously done elsewhere, as though their little world constituted the whole globe. They seem determined as far as possible to ignore that many fossils, plants, beetles, moths, and flies, etc., are common to both the Old and New Worlds, to say nothing of birds, fishes, mammals, etc., and that many other species only show slight variations in type, far less indeed than the inhabitant of the Eastern States differs from the typical "John Bull," his progenitor.

If I can only induce entomologists in America to take a world-wide view of matters, and not confine their ideas and minds to their own little collections, circumscribed by four walls, this feeble protest of mine will not be thrown away, and much pain and grief be saved to humble students like myself.

What a terrible punishment it would be in the hereafter to be doomed to perpetually make out new lists of such "jawcrackers" as appear in the list in question!

E. FIRMSTONE HEATH, Cartwright, Manitoba.

Mailed September 4th, 1901.

Coccidæ Americanæ.

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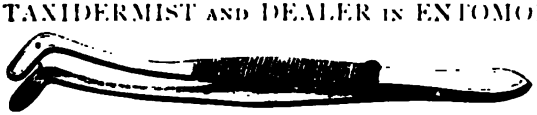
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The Canadian Entomologist

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No. 10.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

OCTOBER, 1901.

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1901.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. J. B. A. L. LEYMARIE, 25 Boyer Lane, near Rachel Street, Montreal, P. Q.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19*b*, 20, 23, 25*d*, 25*g*, 25*h*, 34*b*, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

WILL COLLECT this season all orders (except Lepidoptera) in the fertile North Valley hill region of Chester County, in exchange for Phytophagous Hymenoptera and Evaniidæ, or other Ichneumonoidea. J. CHESTER BRADLEY, 2221 Spring Garden St., Philadelphia, Pa.

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DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelpha.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII. LONDON, OCTOBER, 1901. No. 10

NEW DIURNAL LEPIDOPTERA FROM BOLIVIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

Papilio Cochabamba, sp. nov.

Habitat: Bolivia. Expanse, 4.00 inches.

Front of head dark, greenish black. Between the eyes, two dots of greenish white, and another dot at "collar," followed by two more similar dots on front of thorax. Antennæ, greenish black, extreme point slightly brownish. Thorax, above, dark greenish black; beneath, black with a large yellowish spot at base of costal nervule, another also at base of costal nervule of hind wing, both with a small white dot above them. Legs, black above; beneath, whitish, the white extending on to thorax as a dash.

Abdomen above, greenish cream colour (very prominent), black tip. Below, black with a white spot at base of each segment on both sides. Between these spots and the cream colour of upper part, are a series of yellowish dashes.

Fore wings above, greenish black, but with a decided greenish lustre covering outer half. The interspaces at hind margin edged with white.

Hind wings of same ground colour, the greenish lustre being somewhat brighter and more prominent. Covering nearly the whole of the subcostal space is a large dash of greenish white, followed by a row of similar, although smaller, spots or dashes extending in *a straight line*, from apex to anal angle, each about one-eighth inch wide and one-eighth inch long, diminishing in size towards anal angle. These are about one-third inch from hind margin, not touching, however, the discoidal space, and form the only prominent marking of the insect. The hind margin is strongly dentated with interspaces bordered by a white line.

Under side of fore wings: black, shading into gray black at a line drawn from inner angle across the wing towards outer part of discoidal cell. In the three lower interspaces, one-fourth inch from hind margin is a patch of whitish scales, suggestive of spots.

Under side of hind wings is entirely of bronze colour, somewhat lustrous, excepting at the top portion of each interspace, where there is a whitish spot, and inside of that, one-sixteenth inch from margin, a semicircle of brick colour, very prominent. The dentations of the wing bear the white linear border appearing on upper side.

The specimens in my possession were taken some two hundred miles north from Cochabamba. In general appearance, it resembles closely *Papilio Numitor*, Cram., and that group, and may be a climatic variation of it, but in *Numitor* the greenish-white dashes on hind wing follow more closely the contour of the hind margin, while in this these dashes are more in line with a line drawn from apex to anal angle. My specimens are invariable, showing no difference in the suffusion or size of dashes.

Dynamine albidula, sp. nov.

Habitat: Bolivia, near Sicasica. Expanse, 1.25 inches.

Head, palpi, thorax and abdomen above, blackish with gray hairs; beneath, nearly white. Antennæ, black with white annulations at the base of each joint. Club, tipped with tawny. Legs, white.

The lower portion of the fore wing is white, from a line drawn from a point close to the base on inner margin, and extending upwards to and along the median nervure to end of discoidal space, then curving downwards to lower angle, meeting inner margin one-sixteenth inch from angle. The rest of the wing is black with white spots. The discoidal space is heavily dusted with lustrous greenish-blue scales. In the centre of the space is a small white spot. Midway between apex and base is a large white spot, extending from costa towards hind margin, and directly over the summit of the lower white area. Just within hind margin, one-third distance from apex to lower angle, is a smaller white spot, and there is another below it, one-third distance from lower angle to apex. The latter of these merges into the white area of the lower portion of the wing.

Upper side of lower wing is entirely white, excepting a small area of black at the very base, and a narrow border of black along hind margin. This border is black at the upper angle, and turns to grayish at the lower half, disappearing entirely just before it reaches anal angle. Outside of this, on the edge of the margin, is a white thread.

The white area of upper side of fore wing is duplicated on under side. The black of the upper side gives way to a great extent to tawny. The discoidal space is jet black at its upper portion, tawny at basal portion,

the black extending down along the median nervure towards base. In the centre of the black area is a white spot. Separating the black from the tawny is a thread of very lustrous greenish-blue, nearly silver. This tawny colour extends to costa, the costa being tawny up to apex. A greenish-blue lustrous line extends from base along costa for one-quarter inch. The large white spot of upper surface is repeated. The first white spot at hind margin of upper surface is repeated, but suffuses strongly upwards to the costa, forming an apical band of white. At inner edge of this band is a heavy tawny line, the costal and lower portion of it tipped with lustrous greenish-blue scales. The lower white spot is the same as on upper surface. The hind margin has a black thread at its edge, and within this a line of tawny, edged on its inner side by a thread of the lustrous scales.

The lower side of lower wings is the same as upper surface, except the black is replaced by tawny, and the marginal border is edged on its inner side by a thread of lustrous greenish-blue, with a suggestion of a black thread within it.

Type, one specimen ; taken October 1st, 1899.

Amarynthis muscolor, sp. nov.

Habitat: Bolivia, five days travel north from Cochabamba. Expanse, 1.25 inches.

Head, thorax and abdomen, nearly black, with approach to dark mouse colour on top. Antennæ, black, with slight white annulations at base of each joint. Legs, black.

General ground colour of upper surface, a dark mouse colour, with black markings. Costa of fore wings of ground colour. Hind margin, without border, except a slight linear black line and a fringe of hairs. One-eighth inch within margin is a semi-distinct black line, extending from tip down to inner margin, and another the same distance within this. The discoidal space contains four distinct black transverse lines, the outer two joining at top and bottom, forming an egg-shaped figure. From the lower junction of these, a black line extends downwards at right angles to the costa to the submedian nervule. The inner two of these discoidal lines do not join, but each extends downwards to submedian nervule. There is a suggestion of still another line, nearer the base, extending also to the submedian nervule.

Upper surface of hind wings nearly duplicates that of fore wings. The hind margin with its two inner lines and hairy fringe is the same.

The inner line forms a continuation of the line of fore wings which extends downwards from the egg-shaped figure, noted above. The outer line of the inner two lines mentioned as crossing the discoidal space of fore wings extends across the wing from costa to anal angle, where it joins the two broader lines. Within this, in discoidal space, are three lines, and a suggestion of a fourth near the joint. Inner margin, of ground colour, fringed with hairs.

The under surface is brilliant, the outer half of both wings being sky blue with a mother-of-pearl lustre. The costa of fore wing is mouse colour, with a linear dash of sky blue extending upwards from base. Hind margin is same as on upper surface, except that the slight hairy fringe shows whitish. The inner half of wing is blue-black. The dividing line between the inner and outer half is broken at the first median nervule, forming a jut. The discoidal space contains four sky blue spots, the second and fourth from the base being very prominent. Below the second one, above the submedian nervure, is another spot of the same colour. The space above inner margin is mouse colour, somewhat suffusing the blue-black of inner half of wing.

Under surface of hind wings much the same. The border of hind margin is same as on fore wings, but the first border line of the upper surface is duplicated. The line separating the blue-black and sky blue is continuous, extending from midway between apex and base to anal angle. The discoidal space contains but two sky blue marks, which are duplicated in a less degree in the space next below. The inner one is also duplicated similarly in the space above the discoidal space. The sky blue of outer half of wing extends upwards somewhat, along inner margin, and also suffuses the lower portion of the blue-black ground.

Described from three specimens in my collection from Cochabamba district, 1899.

Eurybia hari, sp. nov.

Habitat: Bolivia, north of Cochabamba. Expanse, 2.15 inches.

Head and eyes, dark fulvous brown, with a "collar" of reddish-brown yellow. Antennæ, nearly black, with yellowish points. Thorax and abdomen, dark mouse colour, somewhat lighter underneath. Legs, the same.

General ground colour of wings, dark mouse colour, with a border (interspacing) of reddish-brown yellow, covering nearly one-third of both fore and hind wings.

Costa of fore wings, dark mouse colour. Inner two-thirds of wing the same, excepting a prominent black spot in discoidal space, surrounded by a reddish-brown yellow ring, and outside of this a semicircle of same colour. Hind margin has a linear border of ground colour. The interspaces of hind margin contain a dash of reddish-brown yellow extending as far as discoidal space in upper three interspaces and parallelling downwards. These dashes form practically a broad band covering outer third of wing, the nervures of ground colour only showing between them. The outer end of these dashes contains a black arrowhead, small at top interspace, and increasing in size in lower interspaces. The inner end of these dashes contains a black dash, increasing in size in lower interspaces.

The hind wings duplicate these markings, with the following exceptions: The discoidal spot is much less prominent. The semicircle outside of it is missing. The linear border is also missing, the reddish-brown yellow extending clearly to margin.

The under side of both wings is the same as upper side, excepting that the ground colour is much lighter, and the yellowish portions suffused somewhat with ground colour. The discoidal spots are more prominent owing to the lighter shade of the background, rather than to any change of their own.

The general appearance is close to *Eurybia Jemina*, Hew.

Described from two specimens in my collection, secured by my collector, Mr. William J. Gerhard, at a point five days north from Cochabamba, Bolivia. In all the collections examined, including the largest collections in this country and in England, only one of this species was found, that being in Mr. Hewitson's collection, unnamed.

THE COLORADO POTATO BEETLE IN ENGLAND.

Although the announcement that the Colorado beetle had been discovered at Tilbury Docks (near London) must have given rise to some apprehension on the part of agriculturists in general, and potato-growers in particular, we are able to state, as the result of inquiries, that there now exists no cause for alarm, the prompt action of the Board of Agriculture having succeeded in exterminating, so far as is possible to judge, the dangerous insect. Little, if any, damage was done by this visitation, which seems to be the first for fifteen or twenty years. The land around Tilbury Docks is not agricultural, and if potatoes are

cultivated it is by the labourers who obtain allotments for the purpose of growing vegetables for their own consumption.

The story of the discovery of the Colorado beetle at Tilbury is briefly this: Situated at the north-east corner of the docks belonging to the London and India Dock Company, are some allotment gardens, occupied by employés of the company for the consideration of a "peppercorn" rent. Whilst gardening in one of these plots, a man came across what to him was a strange insect, unlike anything he had seen before. In his perplexity he made inquiries, the result being that the Board of Agriculture were communicated with. That body submitted the insect to their experts at the Natural History Museum, at South Kensington, who pronounced it to be the Colorado beetle. Representatives of the Board of Agriculture were despatched to Tilbury immediately, and they made a most careful examination, not only of the land affected, but of the surrounding area, in which work they were accorded every assistance by the officials of the dock company. The plots upon which the beetle had been found were first dealt with, all the vegetation being cut down, made into small heaps, and burnt with the help of hundreds of gallons of oil. The ground was afterwards ploughed vigorously, and minute care was taken in destroying the insects. The land adjoining received similar treatment. So complete and thorough were the means adopted that when the inspectors of the Board of Agriculture left the scene they expressed in no equivocal terms the conviction that the dangerous pest had been wholly annihilated.

How the beetle came into this country is, of course, a matter for conjecture. It may, however, be reasonably assumed that it was imported in one or more of the American boats which call at Tilbury, but, although the transatlantic steamers were searched, no trace of the pest could be found.

All persons occupying land in the vicinity of Tilbury have been warned to look out for the beetle, and if there should be another outbreak to give immediate notice to the Board of Agriculture through the police. The penalty for disobedience involves a penalty not exceeding £10, and it should also be remembered that keeping or selling any living specimens constitutes an offence under the Act, and is punishable by a fine not exceeding a similar amount. The insect is known to most people as being somewhat like a large "lady-bird," having longitudinal black lines down the wing-cases, the underneath being of a yellowish tint.—*Daily Telegraph*, Sept. 5.

SOME NECESSARY CHANGES AND CORRECTIONS IN NAMES OF ORTHOPTERA.

BY JAMES A. G. REHN, PHILADELPHIA, PA.

MANTIDÆ.

MIOMANTIS, Saussure. Bull. Ent. Suisse, III., p. 64, 1870.

Preoccupied by *Miomantis*, Blanchard. D'Orbigny, Voy. Amer. Merid., VI., Ins., p. 209, 1842 (Coleoptera). To fill the deficiency, I propose the name *Calidomantis*.

HARPAX, Serville. Ann. Sci. Nat., XXII., p. 45, 49, 1831.

Preoccupied by *Harpax*, Parkinson. Organic Rem., 1811 (Mollusca). I have not been able to examine the first edition of Parkinson, but in the second the name *Harpax* occurs on page 221 of volume III. To replace Serville's genus, I propose the name *Australomantis*.

PHASMIDÆ.

PHANTASIS, Saussure. Miss. Scient. Mex. Orth., p. 188, 1872.

Preoccupied by *Phantasis*, Thoms. Essai Classif. Cerambyc., p 25, 1860 (Coleoptera). The name *Hesperophasma* is proposed to fill the deficiency.

ACRIDIDÆ.

AKENTETUS, McNeill. Proc. Davenp. Acad., VI., p. 225, 1897.

This generic name has been emended to *Acentetus* (Scudder, Proc. Amer. Acad. Arts Sci., XXXV., p. 45, 1899), in which case it is preoccupied by *Acentetus*, Cabanis (Mus. Hein., IV., pt. 1, p. 102, 1862), in Ornithology. This instance should help to deter the lovers of emendation and purity, the inviolability of the name being the easiest and most satisfactory method in this as well as all cases where a *typographical* error is not evident.

ALPHA, Brunner. Ann. Mus. Cio. Stor. Nat., Genova, XXXIII., p. 121, 1893.

Preoccupied by *Alpha*, Saussure. Smith. Misc. Coll., XIV., p. 121, 1875 (Hymenoptera). In allusion to the habitat of some of the species, I propose the name *Cordillacris*.

The genus *Beta* of Brunner (p. 121) is also antedated in the same way (Misc. Coll., XIV., p. 88), but as his name has no type or included species designated, it cannot be regarded as thoroughly established.

ICHTHYDION, Saussure. Revue et Mag. de Zool., p. 390, 1859.

Preoccupied by *Ichthydion*, Dejean. Catal. Coleopt., II., 1833 (Coleoptera). In the third edition of Dejean, the name is found on page 223. To replace the preoccupied name, I propose the term *Ichthyotettix*.

EREMOBIA, Serville. Orthopteres, p. 704, 1839.

Preoccupied by *Eremobia*, Stephens. Catal. Brit. Ins., Lepidoptera, p. 104, 1829 (Lepidoptera). The next available name is *Tmethis*, Fieber, Lotos, III., p. 128, 1853.

XIPHOCERA *auct (Xiphicera).*

The use of this name by Latreille (Fam. Nat. Regn. Anim., p. 415) is merely in the French form Xyphicère, and as far as I can ascertain, he never used it Latinized in any of his later works. Lamarck is the first author I have found who Latinized the name, *Xiphicera* dating from him (Anim. Saus. Vert., II. ed., IV., p. 444, 1835). The form generally quoted *Xiphocera* (Burmeister, Handb. d. Entom., II., p. 612, 1838) is preoccupied by *Xiphocera*, Macquart. Dipteres, I., p. 279, 1834 (Diptera).

TROPINOTUS, Serville. Orthoptéres, p. 617, 1839.

This name is generally quoted as *Tropidonotus* (Stol, Syst. Acrid., p. 14, 1877), but the emended form is preoccupied by *Tropidonotus*, Kuhl. Wagler's Nat. Syst. Amph., p. 179, 1830 (Reptiles).

TETTIGONIDÆ.

SCHŒNOBATES, Saussure. Revue et Mag. de Zool., p. 209, 1859.

Preoccupied by *Schœnobates*, Blackwall. Ann. and Mag., Nat. Hist., VI., p. 343, 1850 (Arachnida). In place of the preoccupied name, I propose *Anabropsis.*

PSEUDANCISTRUS, Bolivar. Artr. Viaje Pac., Neur. y Ort., p. 82, 1884.

Preoccupied by *Pseudancistrus*, Bleeker. Ned. Tijds. Dierk, I., p. 78, 1863 (Fishes). I suggest *Polyancistroides* to replace the preoccupied name.

AMAURA, Brunner. Monogr. der Phaneropt, p. 247, 1878.

Preoccupied by *Amaura*, Moller. Ind. Moll. Grœul., p. 7, 1842 (Mollusca). The name *Ligocatinus* is proposed to fill the vacancy.

GRYLLIDÆ.

APHONUS, Saussure. Miss. Scient. Mex., Orth., p. 466, 509, 1874.

Preoccupied by *Aphonus*, Leconte. Proc. Acad. Nat. Sci., Phila., VIII., p. 21, 1857 (Coleoptera). To replace the preoccupied name, I propose *Aphonogryllus.*

DYSCOPHUS, Saussure. Miss. Scient. Mex., p. 438, 1874.

Preoccupied by *Dyscophus*, Grandidier, Ann. Sci. Nat., V. ser., XV., art. 20, p. 10, 1872 (Reptiles). In place of Saussure's name, I propose *Dyscophogryllus.*

THE EASTERN SPECIES OF PSYCHODA.

BY NATHAN BANKS, EAST END, VA.

In the CANADIAN ENTOMOLOGIST for December, 1894 (Vol. XXVI., page 329), I presented the species of Psychoda then known to me from Long Island, N. Y. In the following year, in the November number (Vol. XXVII., page 324), I added some notes and described one more species. Since then nothing has been published on our Eastern species. Prof. Kincaid, however, has been active in studying the Western species.

During the past few years I have collected them at Washington and vicinity, and obtained three new species as well as many of those previously described. I now give a table of all the Eastern species, twelve in number, with descriptions of the three new forms:

TABLE OF SPECIES.

1. Black-winged species..... 2.
 Gray-winged species..... 8.
2. Wings with iridescent scales, hind tarsi only partly white.....*nitida.*
 Wings without iridescent scales..... 3.
3. Hind tarsi wholly pale yellowish or whitish..... 4.
 Hind tarsi black or only partly pale..... 5.
4. Two black patches on the wings before the middle.....*marginalis.*
 No black patches.....*albitarsis.*
5. Hind tarsi wholly black, wings and fringe all black..... 6.
 Hind tarsi with some white marks, wings and fringe marked with pale..... 7.
6. Thorax white.....*bicolor.*
 Thorax black.....*nigra.*
7. Fringe on posterior margin blackish; abdomen with white hair; wings banded with pale, legs pale.....*Slossonæ.*
 Fringe on posterior margin more whitish; apical margin with distinct black dots, wings not plainly banded, though with scattered white hair; legs black.....*superba.*
8. Wings uniform gray..... 9.
 Wings marked with black..... 10.
9. Larger; at least two millimeters long; fringe on hind margin fully as long as usual.....*cinerea.*

Smaller; less than two millimeters long; fringe on hind margin rather short..... *minuta.*

10. Hind tarsi with black at base and tip; wings banded, with distinct dots at ends of veins, but not two spots on margins beyond middle..... *signata.*

Hind tarsi unmarked (yellowish); dots at ends of veins; wings scarcely banded, no basal black band, nor two spots on margins beyond middle..... *alternata.*

Hind tarsi uniform dark brown; wings with a basal black band, beyond the middle a black spot on each margin, and one or two apical dots..... *opposita.*

Psychoda cinerea, Banks.—This species is known by its uniform pale appearance and average size. It is common at Washington, D. C., and Falls Church, Va., in June, and occurs at Ithaca, N. Y.

Psychoda minuta, Banks.—This is our smallest species; I have seen a specimen from Mesilla, N. Mex. (Cockerell).

Psychoda alternata, Say.—This species is common at Falls Church, Va., near houses, in June. It also occurs at Ithaca, N. Y. Eaton has decided that one of the common European species (*P. sexpunctata*, Halid.) is identical with *P. alternata*. The latter name has the priority.

Psychoda signata, n. sp.—Head and thorax clothed with white hair, some tufts of gray at bases of wings; antennæ white, about as long as width of wing; legs white, last few tarsal joints black, and a black ring on base of the first tarsal joint of hind legs; abdomen clothed with white hair. Wings marmorate with pale gray and blackish, rather thinly clothed with hair; a blackish patch near base, another rather before the middle from costa to centre of wing, one on posterior part about behind this one, a long one along the apical costal third of wing, often interrupted by three pale spots, and a few small patches on the apical third of hind margin; all these spots are blackish, irregular, and of indistinct outline. The fringe on costal margin is largely gray, but with two white patches, and the apex white; on middle of hind margin is a long white portion, the rest of the fringe is blackish; the fringe on the hind margin is about one-third the width of the wing. Length of wing, 2 mm.

A few specimens taken near Washington, D. C., in May.

Psychoda opposita, n. sp.— Head and thorax clothed with pale gray hair; antennæ thick, gray, longer than width of wing; abdomen clothed with rather short gray hair; legs brown, none of the tarsi marked with

white. Wings thickly clothed with pale gray hair; near base is a band of black hair, heaviest behind; slightly beyond the middle of the wing there is a black spot on the costal margin and another opposite on the posterior edge, the latter rather the larger; the extreme margin around the tip appears more or less black. The fringe is mostly pale gray, or almost white, on the hind margin; on the base of costal margin it is dark gray; that on posterior margin is almost one-half the width of the wing. Wings rather narrow and acute at tip. Length of wing, 1.7 mm.

Taken at Washington, D. C., on the bark of trees, in the early part of August. Easily known by the two black spots on each wing.

Psychoda albitarsis, Banks.—I have seen specimens only from the type locality, Ithaca, N. Y.

Psychoda marginalis, Banks.—I have only the types of this species, from Sea Cliff, N. Y. It is very distinct by the two patches of black hair on wings.

Psychoda Slossonæ, Williston.—My specimens are all from New York.

Psychoda superba, Banks.—This handsome species is very common at Washington, D. C., from June to August, on the bark of large trees.

Psychoda bicolor, Banks.—I have seen only the types from Sea Cliff, N. Y.

Psychoda nigra, Banks.—I have taken several specimens of this species at Falls Church, Va., close to a stream, in June. The fringe on the hind margin of wings is very long.

Psychoda nitida, n. sp.—Thorax in front densely clothed with long gray hair, behind at the bases of wings it is darker, often black. Abdomen black, with jet black hair. Legs black, with black hair; on the basal joints of all tarsi are some white scale-like hairs. Wings clothed with black, and some iridescent scales showing a bluish, greenish or coppery hue, according to the light and position. Fringe black, white at tip of wing. Tips of veins usually show heavier patches of black hair or scales. Antennæ slender, moniliform, slightly longer than the width of wing. Wings moderately broad, scarcely acute at tip, the fringe on posterior margin being about one-fourth the width of the wing.

Length of wing, 2.6 mm.

This species is found at Washington, D. C., on the bark of large trees, in July. The iridescence of the scales on the wings at once separates it from all our other forms.

CONCERNING PROTESTS AND OTHER THINGS.

BY JOHN B. SMITH, SC. D., RUTGERS COLLEGE, NEW BRUNSWICK, N. J.

There never yet was anything new or revolutionary advanced or suggested that was not met with a "protest" from some quarter. When machinery was introduced the hand-workers protested; when railroads supplanted stage coaches the coachmen protested; and so on. So we never had a new list in any order of insects, where changes in nomenclature were made, which was not denounced by someone who found himself or herself compelled thereby to take new views or learn new names.

Of course, protests have their uses, and are always interesting; so, that by Mr. Heath, in the September number of the CANADIAN ENTOMOLOGIST, was carefully read by me. Of course, it should really be answered by Dr. George D. Hulst; but he is, unfortunately, dead, and as he was a very good friend of mine, I will do the best I can in his behalf as well as my own, for I must plead guilty to being an American, and am uneasily suspicious that, since I happen to know about *Tephroclystis*, I must be included among the pseudo-savants.

Let me say first of all that Mr. Heath has been for some time a very good correspondent of mine, that I have found him always open-handed and open-minded, ready to do all in his power to further entomological science, anxious to aid, and willing to be aided; therefore, whatever I may say here is not meant as a reflection upon him—only an appeal to his natural love of justice, and a plea that he do not scold too hastily.

A protest always carries weight in proportion to the authority or knowledge of him that makes it, or the force of fact or argument with which it is backed up. Now, what does Mr. Heath really protest against? Specifically, only the use of *Tephroclystis* is mentioned, but inferentially other "new" and unfamiliar names are included in the ban. *Tephroclystis* is not so well known perhaps as *Eupithecia*, though it may rival "pugs" in familiarity; but would it not have been fair for Mr. Heath to show, first, that it is really a new name, and second, that there was no sound reason for the change other than that it did not mean "pugs." Before making his protest and scolding "American pseudo-savants" he should have made sure of his ground, and become genuinely "savant" himself. Had he done so he would have found that *Tephroclystis* is a Hubnerian term far antedating *Eupithecia*, Curtis, and that, following the law of priority, Hubner's name simply had to be used. If

it be objected that nomenclature ought not to be disturbed, and things ought not to be upset, it might be in order to suggest that Lord Walsingham and Mr. C. Hartley Durrant, both good Englishmen, have been the greatest disturbing factors of the decade so far as reinstating Hubner's names is concerned. A great part of Mr. Heath's scolding in the second paragraph, therefore, applies to them more perfectly than to any American entomologist. Finally, it may be noted that in Staudinger and Rebel's catalogue, just issued, *Eupithecia* is replaced by *Tephroclystis*, Hbn., and *Chloroclystis*, Hbn. Dr. Hulst was, therefore, neither arbitrary nor singular in using the term.

I am greatly afraid that, unless he wishes to remain solitary, Mr. Heath must give up *Eupithecia*, though there is no canon of nomenclature that opposes his hold on " pugs."

American entomologists and American naturalists generally are accused of being narrow, and confining their ideas " to their own little collections," etc., and this charge is just about as well based as the other. The truth is there are no broader students, literally and otherwise, to be found anywhere than in America; which is not saying that we do not have the other kind as well. But specialists are needed as yet where so much material remains undescribed, and the would-be monographer of a world-wide fauna finds himself very frequently compelled to limit his ambition by the wealth of new local material coming in to him.

There are many of the newer entomological recruits who do not realize the difficulties with which the earlier students had to contend. Before 1860, almost all American Lepidoptera were described in foreign publications, from Linné to Guenée and Walker. So, of necessity, the American student became familiar with the general world classification to that date. For years afterward everything was compared with European species, and, so far as possible, American forms were identified with those of other countries. Students like Zeller, Speyer, Moeschler and Staudinger co-operated, and the charge that American work was done without regard to what has been done elsewhere is simply absurd.

Of course, as in all countries, the work of special students was more or less confined to the local fauna. The fact that in so many countries work was simultaneously done has resulted in duplicating descriptions of similiar structural combinations under different generic names. It is the work of the student now, to collate and systematize, as Sir George F. Hampson is doing with the British Museum material at command. This

will, of necessity, cause some change and shifting of names. I am led to say further, that no students have travelled so much to make comparisons as have the Americans. Grote, Fernald, Hulst and others, as well as myself, have visited all the European collections — some of us more than once — and have spent dollars, pounds, francs and marks in painful number to gain that broad knowledge for which we are now dubbed "pseudo-savants."

Now, I doubt whether I would have imposed all this upon the readers of the CANADIAN ENTOMOLOGIST except as a sort of introduction to another point, which the following quotation from a correspondent's letter will make clear: "In sending specimens to be determined in the customary way (the namer to have the privilege of retaining any specimens he may desire), if I send a species *new to our fauna*, does custom require its return to the sender, or is the recipient to keep, name and describe it—i. e., *steal* it bodily?" The italics are as in the original.

Now, how many persons who have asked that same question, and who have found fault with the answer, ever really understand what they are asking when they send in a box of insects numbering anywhere from 25 to 250 specimens for determination to one who is under no sort of obligation to do it?

First, they draw upon a store of knowledge that has been acquired by over twenty years of study; they demand the time necessary to make comparisons, to unpack, repack, often the replacement of a defective outer box or a new cover; very often the payment of return postage, almost always the payment of correspondence postage. Second, they often expect comments or information concerning the species, its rarity, value, larva or its life-history, and other matters too numerous to mention.

And in return for all this, what do they offer? In many cases nothing at all; but rather claim it as a right; in other cases, permission to retain such as they have in duplicate!

I have frequently spent a solid half day naming a box of specimens in which there was not a single example that was of use to me! I need hardly say that I could have found more profitable employment for my time. In Noctuids, the collection under my charge at New Brunswick is, perhaps excepting that of the U. S. National Museum, the most complete in the country. Of the Eastern and Central U. S. species, not a dozen are lacking; but that dozen I need badly. Once or twice each year, out of hundreds of species that pass through my hands, I find one

or two of the desiderata. It is the only pay I ask,— permission to retain such as are needed for the collection, and I do not consider it excessive. When I say that during the winter months I frequently get half a dozen sendings in one week, and often spend an entire day of ten hours in making determinations, the extent of the labour imposed on me may be estimated.

I wish it to be distinctly understood that I do not object to making determinations; it is a real pleasure to me to look over a lot of material, especially if in good condition and from a new locality; but I do feel sometimes that my work is not appreciated, and that an insect or two retained for the collection is rated exceedingly high when grumblingly yielded in return. It has occurred to me that where I have spent an hour or two in determining a species as new, and have given its genus, the collector to whom I returned it described it without even crediting me with the generic reference. Nowadays I give no such references.

Of course there are exceptions to all rules, and so many of my correspondents are liberality itself, giving me absolute disposal of the material sent for study, they will not apply what I have said to themselves, and will, I think, testify that I do not often abuse their confidence. I will repeat, however, that Mr. Heath comes in with the exceptions, and is a *persona grata* on my list. I cannot promise to be influenced by his protest, but I can recommend him as a very amiable and satisfactory correspondent.

CATERPILLARS ATTENDED BY ANTS.

In his paper on "The Food-plants of the Butterflies of the Kanara District of the Bombay Presidency," Mr. L. de Nicéville, of Calcutta, states (page 190) that the choice of the food-plant by the butterfly, in the case of many of the *Lycænidæ*, is largely dependent upon the presence of the particular species of ant with which it lives in harmony in its larval condition. "If the right plant has no ants, or the ants on that plant are not the right species, the butterfly will lay no eggs there. Some larvæ will certainly not live without the ants, and many larvæ are extremely uncomfortable when brought away from their hosts or masters. In many cases it is just as important for breeding purposes to know the right species of ants as to know the right food-plant. In Kanara this is particularly noticeable in the cases of *Castalius ananda*, *Zesius chrysomallus*, *Aphnæus lohita* and *Catapœcilima elegans*. *C. ananda*

is 'protected' by ants of the genus *Cremastogaster*. On one occasion Mr. Bell was collecting larvæ at Katgal, and the ants were principally on *Zizyphus rugosa* (Nat. Order *Rhamneæ*), but were also swarming all over six or seven different species of trees all around, and on all of these trees there were larvæ of *C. ananda* covered with ants and eating the leaves of the trees in every case. Since then he has noticed the larvæ of this butterfly eating the leaves of many different plants and always in company with the same species of ants. With regard to the other butterflies mentioned above, the females first look for the right species of ant, while the species of food-plant seems to be quite a secondary consideration, at any rate to a considerable extent. The larvæ of *Zesius* may be found on very nearly any plant that harbours the large red ant, *Œcophylla smaragdina*, so much so that Mr. Bell has often had a suspicion that the butterfly larvæ will occasionally eat the ant larvæ, though he has not actually seem them do so. The larvæ of the other two butterflies are only found on plants affected by ants of the genus *Cremastogaster*. The larvæ of all the four species are often found in the ants' nests, and their pupæ occasionally." Mr. de Nicéville then gives a list of twenty-seven species of *Lycænidæ*, twenty-four of which are attended more or less frequently bv ants.

As long ago as 1878, Mr. W. H. Edwards gave in this magazine (CAN. ENT., Vol. X., pp. 131–136) a most interesting detailed account of his observations on the larvæ of *Lycæna pseudargiolus* and the attentions bestowed upon them by four different species of ants. The object of the ants was to obtain the sweet fluid extruded by the larvæ, and in return they warded off enemies threatening the caterpillars in their charge.

Mr. S. H. Scudder also gives an interesting "Excursus" on this subject in his great work, "The Butterflies of the Eastern United States and Canada," page 962, Excursus XXXV.

PUPÆ OF LYCÆNIDÆ.

In the paper already referred to (page 247), Mr. de Nicéville gives a list of eight genera of *Lycænidæ* which have the pupa suspended by the cremaster alone with no median girth; on this account he considers that they seem to form a very natural group, as it is an extremely rare character in this family of butterflies. This fact rather upsets the familiar division of the Rhopalocera into Succincti, Suspensi and Involuti, in accordance with the mode of attachment of the pupæ.

BEES FROM SOUTHERN CALIFORNIA, VISITING FLOWERS OF ERIOGONUM AND RHUS.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Southern California has its dry season in the summer, and comparatively few flowers are to be seen. Among those that remain, and are attractive to insects, the bushy species of *Eriogonum* are especially noteworthy, and I was fortunate in obtaining from them several bees.

Eriogonum fasciculatum was determined for me by Mrs. K. Brandegee. The Mt. Lowe species, which look very distinct from *fasciculatum*, is kindly identified by Miss Susan G. Stokes as *E. fasciculatum polifolium*, "one of the intermediate forms." This is the *E. polifolium* of Bentham.

Prosopis polifolii, n. sp.—♂. Agrees with the description of *P. Nevadensis* (Psyche Suppt., June, 1896, p. 32) except in the following particulars: Clypeus and lateral marks very pale primrose yellow; the lateral marks rather narrow, triangular, not or hardly notched by the antennal sockets, terminating above at a very acute angle with the orbital margin, though the apical point is rounded, the inferior inner side of the triangle at least not longer than the superior, sometimes visibly shorter; flagellum ferruginous beneath; wings clear, strongly iridescent. There is no vestige of a supraclypeal mark; clypeus much longer than broad, punctured and minutely roughened.

Hab.—Alpine Tavern, Mt. Lowe, Calif., about 5,000 ft., Aug. 12, 1901, on flowers of *Eriogonum polifolium;* La Jolla, Calif., about 150 ft., August, 1901, on flowers of *Eriogonum fasciculatum.* The first-mentioned locality is to be regarded as typical. The species, having no supraclypeal mark, can only be confused with *P. Nevadensis.*

Ceratina Arizonensis, Ckll., 1898—♀. Similar to the ♂, but the face is black, with a broad longitudinal white stripe on the clypeus.

Hab.—Alpine Tavern, Mt. Lowe, Calif, about 5,000 ft., Aug. 12, on flowers of *Eriogonum polifolium.* New to California.

Perdita Claypolei, n. sp.—♀. Length, 5 mm.; head and thorax dark brassy green, with moderately abundant white hair; abdomen piceous, with broad straight transverse chrome-yellow bands at bases of

segments two to four, none of them reaching the lateral margins of the segments; ventral surface dark. Head rather large, transversely oblong, broader than thorax; *face wholly dark;* front microscopically tessellate, with sparse distinct punctures; occiput with abundant white hair; antennæ short, dark, flagellum ferruginous beneath towards tip; anterior margin of prothorax above, and tubercles, cream-colour; mesothorax and scutellum shining but microscopically lineolate, with very sparse punctures; base of metathorax minutely roughened; tegulæ tinged with brown; wings short, reaching about to middle of fourth abdominal segment, the apical veinless field large; nervures dark brown; stigma centrally pale; marginal cell obliquely truncate, its post-stigmatal portion largest; second submarginal cell large, narrowed about one-half to marginal; third discoidal cell distinct; legs piceous; anterior knees and anterior tibiæ in front, cream-colour; apex of abdomen ferruginous, acutely pointed.

Hab.—Alpine Tavern, Mt. Lowe, Calif., about 5,000 ft., Aug. 12, three on flowers of *Eriogonum polifolium*. The hind femora carry great masses of yellow pollen. In my tables this runs to *P. sphæralceæ*, but *P. Claypolei* is a smaller insect, with darker nervures and a much more shiny mesothorax.

A few hundred yards from the spot where this species was taken, one comes to a point which commands a splendid view of the lowlands, with the City of Pasadena, the scene of the last labours of Prof. E. W. Claypole, in the distance. The bee is accordingly named after the inspiring teacher and able naturalist who has so recently been taken from us.

Colletes Americana, Cresson, 1868. — Four males at flowers of *Eriogonum fasciculatum*, La Jolla, Calif., Aug., 1901.

I take this opportunity to describe another new Californian *Perdita*, not found on *Eriogonum*: —

Perdita rhois, n. sp.— ♀. Length, 5 mm.; head and thorax dark bluish-green, base of metathorax decidedly blue; pubescence short and scanty; abdomen piceous, with broad straight transverse yellow bands on bases of segments 2 to 5 (rarely absent on 5), all but the first produced to the lateral margins of the segments, though narrowed a short distance before the margin; ventral surface of abdomen yellow. Head ordinary, nearly circular seen from in front; clypeus not in the least concealed by hair; clypeus (except two minute dots) and lateral

marks chrome-yellow; lateral marks small, nearly equilateral triangles, not reaching up to antennæ; no supraclypeal or dog-ear marks; mandibles yellow at base, ferruginous in middle, dark at tips; labrum dark, with a central depression; labial palpi with the first joint a trifle longer than the other three united; antennæ dark brown above, chrome-yellow beneath, including scape; front microscopically tessellate and with sparse minute punctures; mesothorax shining, but microscopically tessellate and sparsely punctured; tubercles yellow, but no other part of prothorax; tegulæ transparent, with a yellow spot; wings milky-hyaline, iridescent; nervures white; *stigma very large*, colourless, with a light brown margin; marginal cell rather obliquely truncate, the post-stigmatal portion the shortest; third discoidal cell distinct; legs dark, anterior knees, anterior tibiæ except a stripe behind, and middle tibiæ beneath, yellow; anterior tarsi yellowish.

Mut. *reducta*.— ♀. Clypeus with two very broad black median bars, between which is left only a small yellow streak or triangle; lateral marks wanting or represented by two or three small spots; tubercles wholly dark; scape without the yellow stripe; abdominal bands narrow, not reaching lateral margins, sometimes only the first two bands well developed; venter of abdomen dark.

Hab.—San Diego, Calif., Aug. 4, 1901, at flowers of *Rhus laurina*, Nuttall, in the immediate vicinity of the Brandegee Herbarium. The plant was kindly identified by Mrs. K. Brandegee. There were taken four of the type, and three of mut. *reducta*, all from the same shrub. The dichroism of the species is quite remarkable.

In my tables, *P. rhois* runs to *P. bigeloviæ*, and is especially to be compared with *P. Crawfordi*, from which it differs by its large stigma and other characters.

While on the subject of *Perdita* the following may be placed on record: —

Perdita callicerata, Ckll.; Mesilla Park, N. M., June 9, 1898, one ♂ at flowers of *Atamosco longifolia (Zephyranthes longifolia*, Hemsley).

Mr. E. S. G. Titus wishes mention to be made that his recent articles on Bees in this magazine, Vol. XXXII., page 303, and Vol. XXXIII., pages 133 and 257, are to a large extent portions of a thesis for the Degree of M. Sc. placed on file with the Secretary of the State Agricultural College of Colorado, May 1st, 1901.

SOME NEW DIPTERA.

BY CHARLES ROBERTSON, CARLINVILLE, ILLINOIS.

Zodion palpalis, n. sp.

♀.—Black, gray pollinose; face yellow, cheeks yellow, one-half the eye height; front reddish yellow, a narrow black line on each side above; antennæ reddish, second joint shorter than third; palpi black, quite long, clavate; mesonotum without stripes; scutellum with about twelve slender bristles; legs black, knees testaceous; wings subhyaline; first four segments of abdomen with large, subtriangular opaque black spots, last segment black, shining. Length, 5 mm.

♂.—Cheeks more than one-half the eye height; second and third segments of abdomen yellow, fourth with a subtriangular patch destitute of pollen. Length, 5 mm.

Carlinville, Illinois; one ♀, nine ♂ specimens. All except one specimen have the first posterior cell closed and petiolate.

This species is quite distinct from *Z. fulvifrons* and *Z. nanellum*.

Sphegina campanulata, n. sp.

♂.—Front black, grayish pollinose, with a median, narrow shining stripe; occiput black, lightly dusted; thorax and abdomen entirely reddish, the latter more shining, fourth segment in one specimen a little infuscated with blackish; face, cheeks, antennæ, proboscis and halteres more yellow; front and middle legs whitish, last two joints of their tarsi blackish; hind legs reddish, base of femora, tibiæ, except tips, and joints two and three of their tarsi whitish, last two joints of tarsi blackish; wings subhyaline, anterior outer angle of first posterior cell rectangular; second joint of abdomen longer than remaining joints together, fourth segment shorter and wider than third, the two regularly widening from base of three to apex of four, hypopygium very large. Length, 6–7 mm.

Carlinville, Illinois; two specimens.

Mallota Illinoensis, n. sp.

♀.—Eyes bare; face deeply concave below antennæ, tubercle as usual, the cheeks and median stripe shining black; front broader than in *M. posticata* and *cimbiciformis*, yellow pollinose, except a patch above antennæ, yellow pilose, on the vertex the pile long and reddish, antennæ blackish, second joint and arista reddish; mesonotum reddish posteriorly, with obscure pollinose streaks anteriorly, scutellum yellow and with the mesonotum clothed with long reddish pile; legs reddish, the femora more

or less blackish, the knees yellow, pile yellow ; wings with a brown cloud ; abdomen brown, shining, with thin fuscous pile, the pile on the sides, middle and apical margins longer, yellowish, less erect. Length, 14 mm.

♂.—Eyes separated, pile and pollen of face more whitish, anterior and middle femora darker, abdomen inclining to ferruginous, hind femur beneath presenting a dentiform angle bearing a tuft of black pile, sides of second segment presenting a depression which shows a purplish reflection. Length, 12–13 mm.

Carlinville, Illinois ; one ♀, two ♂ specimens.

Temnostoma trifasciata, n. sp.

This species closely resembles *T. bombylans*, but the wings are brown before, that colour not extending behind the fourth longitudinal vein; the abdomen of female has only three fasciæ.

Carlinville, Illinois ; three ♂, two ♀ specimens.

Phorantha purpurascens, Twns.

Hyalomyia purpurascens, Townshend. Proc. Ent. Soc., Wash. 2 : 137, 1891. This species was described from four males and four females from my collection. It is more common in my neighbourhood than all of the other species of *Phorantha* and *Alophora* together. I know the species very well. I still have eighteen specimens from the set from which the types were described. Altogether I have forty males of this species and they all have the calypteres brown. On the other hand, twenty-one females have the calypteres whitish.

From the material afforded in my neighbourhood, I think that Coquillett's *P. occidentis* contains the females of at least three distinct species. Assuming that Walker's type was a female and that it was the commonest species, *P. purpurascens* may be a synonym. I do not believe that, without comparing the type, it can be shown that Walker's species was the same as *P. purpurascens*, or even that it was a *Phorantha*.

Hyalomyia Robertsonii, Twns., was also founded on specimens from my collection. I do not know what it is, but the specimens were larger than those of *P. purpurascens*, and all of the specimens I have that were referred by me to this species belong to *Alophora*. I think they are females of *A. æneoventris*.

Phorantha pruinosa, n. sp.

♂.—Closely resembles the male of *P. purpurascens*, but the abdomen

is black, without any metallic reflection, the first segment shining, the second, third and fourth densely whitish pollinose. Length, 3 mm.

Carlinville, Illinois; three male specimens.

Phorantha humeralis, n. sp.

♂.—Closely resembles the male of *P. purpurascens*, but is larger, the wings more whitish, the base and costal margin as far as first vein more or less brown. Length, 4–5 mm.

♀.—Differs from females of *P. purpurascens* only in its larger size. Length, 4–5 mm.

Carlinville, Illinois; ten ♂, three ♀ specimens.

Epigrimyia Illinoensis, n. sp.

♂.—Closely resembles *E. polita*, front shorter and narrower, more narrow than face; the latter longer, wider, cinereous pollinose; cheeks wider; antennæ and proboscis longer; front tibiæ reddish; claws and pulvilli longer. Length, 5 mm.

Carlinville, Illinois; one ♂ specimen.

Winthemia Illinoensis, n. sp.

This species closely resembles *W. quadripustulata*. It differs in its smaller size, the bristles on the abdomen, especially in the male, more sparse, more erect, longer; the second segment in male with a marginal pair of macrochætæ; hind tibiæ, outwardly, in both sexes, less regularly ciliate and presenting a long bristle near the middle. Length, 6–9 mm.

Carlinville, Illinois; five ♂, three ♀ specimens. The sexes were taken in copula.

The name may not stand: the presence of this species seems to throw some doubt on Coquillett's synonymy of *W. quadripustulata*.

NEW BEES OF THE SUBFAMILY ANTHOPHORINÆ FROM SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

Diadasia rinconis, subsp. *opuntiæ*, nov.—♀. About 15 millim. long, varying to 13 millim.; tegulæ light reddish-brown, varying to darker; wing-nervures piceous, second submarginal cell variable, but always small and usually very narrow, and narrowed above; third submarginal cell long, very strongly elbowed at end; labrum with only a few scattered hairs, or sometimes more hairy; mesothorax strongly and quite densely punctured, much more so than in *rinconis;* scutellum closely punctured;

abdominal bands as in *rinconis*, with curved anterior margins; hair at apex of abdomen yellowish fuscous.

Hab.—San Pedro, California, July 27, 1901, at flowers of *Opuntia*, gathering pollen. 17 ♀. First found by my wife. This will probably be regarded as a distinct species, but it is certainly very near to *D. rinconis*, which visits flowers of *Opuntia* in New Mexico (Entom., Sept., 1900, p. 245). The chief difference between *rinconis* and *opuntiæ* is in the much more strongly and densely punctured thorax of the latter; *opuntiæ* is also on the average a considerably bulkier insect. From the Californian *D. friesei*, *opuntiæ* differs in the larger size, closer punctuation of thorax, and the character of the abdominal bands.

(To be continued.)

BOOK NOTICE.

ILLUSTRATIONS OF UNFIGURED LEPIDOPTERA.—By A. G. Weeks, Jr., 360 Washington St., Boston, Mass.

We have received from the author the first thirty-one pages of this work, which he is publishing for private distribution at his own expense. This portion contains the description of seven species of butterflies, all but one of which have been already published elsewhere, but are now illustrated by most beautifully-executed coloured lithographs from drawings by Mr. J. Henry Blake. The species are all from tropical or sub-tropical regions and the types are in the author's collection. The exquisite plates compare very favourably with those in Mr. W. H. Edwards's "Butterflies of North America," which have set a high standard of artistic merit and truth to nature.

An interesting account is given of a collecting trip in Bolivia, made by Mr. Gerhard, of Philadelphia, who was sent by the author to that out-of-the-way and little-known region in order to secure as complete a collection as possible of the butterflies of the country. Though the region explored was in the high altitudes of the Andes, where vegetation was mainly confined to the mountain ravines and river gorges, the collector succeeded in obtaining, during an absence of a little over a year, thirteen thousand butterflies, over a thousand dragon-flies, a thousand beetles, twelve hundred moths, and a large number of other insects. Among these there will no doubt be found many species hitherto

unknown to science, and much valuable information will be afforded by a study of the collection regarding the distribution of species. Mr. Weeks gives in the work before us lists of the butterflies which he has thus far been able to identify. A number of interesting photographic reproductions give some idea of the country traversed by the collector. We look forward to the issue of further instalments of this work, which will, when completed, form a valuable contribution to Lepidopterological Science.

C. J. S. B.

CORRESPONDENCE.

A Surprise.

Sir,—That a *Polyphemus* cocoon would produce its imago the same season it was made, is what I little expected to see; and yet it has taken place; and that in a brief period of time.

The janitor of the Y. M. C. A., London, Ont., was taking his holidays in the latter part of July, and on the 22nd was in the country on a fishing excursion, and found on the ground, under some trees, a *Telea Polyphemus* cocoon. On his return, he informed me of his find. Thinking it was rather early for one of this year's make, I remarked it must be an old one. He said no, that the creature was alive inside. When he presented it to me, I realized at once that it was a freshly-made one, as it was white and free from the slightest indication of weathering. The pupa was very lively, and kicked vigorously. I placed the cocoon on a cabinet close at hand and in full view, and it was much handled by visitors, who expressed surprise at such an inanimate-looking object being so much alive. On the 10th of August I tried to stir it into action for a visitor's benefit, but failed. I left the room about half-past five, and returned about half-past seven, when I noticed that the cocoon was where I had not placed it; and, on examination, I saw the moth hanging to the projecting top of the cabinet. It is a female, perfectly developed, medium sized and light in colouring. The question naturally arises, is it double-brooded somewhere?

J. Alston Moffat.

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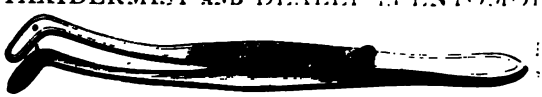
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The Canadian Entomologist

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REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

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1901.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

FOR EXCHANGE.—Butterflies of this neighbourhood, for those not in my collection. Have also a number of chrysalids of *Fenisca tarquinius* for exchange. Address: WILMON NEWELL, Wooster, Ohio.

ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

DIURNALS, LEPIDOPTERA.—Will exchange French butterflies, in paper, for butterflies of U. S. A. and Canada. Please send lists. PROF. J. B. A. L. LEYMARIE, 25 Boyer Lane, near Rachel Street, Montreal, P. Q.

CICINDELIDÆ.—Wanted (Henshaw's List) Nos. 19*b*, 20, 23, 25*d*, 25*g*, 25*h*, 34*b*, 37, 48, 49, 50, 56. For *C. Willistoni* and *C. tenuicincta* write for terms.—W. KNAUS, McPherson, Kansas.

WANTED.—Insect Life, Vol. II., Nos. 1, 2, 9; Vol. IV., Nos. 7, 8, 9, 11; and Bulletins 1 to 4 of Cornell Exp. Station. Will give double exchange for same. WILMON NEWELL, Wooster, Ohio.

BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

DIURNAL LEPIDOPTERA wanted from the W. and N.-W. States for diurnals from Central and northern South America. LEVI W. MENGEL, Boys' High School, Reading, Pa.

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WANTED.—Cicindelidæ, Carabidæ, and rare Scarabaeidæ. Will give good exchange in Exotic and rare European Coleoptera (named), also Odonata and Hymenoptera from N. America. Send list to R. J. WEITH, Elkhart, Indiana.

DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelpha.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII. LONDON, NOVEMBER, 1901. No. 11

TWO NEW SPECIES OF LUCANIDÆ FROM CALIFORNIA.

BY H. C. FALL, PASADENA, CALIF.

Some two years ago I received from Mr. E. A. Schwarz a single example of a curious Lucanide bearing labels "Kaweah, Cal.," and "Ceruchus (?), n. sp." This specimen, as I have since learned, was one of a considerable number taken by Mr. Ralph Hopping six years ago on grain and wild grasses growing near the grain on a small sandy hill at the locality indicated. In a letter just received from Mr. Hopping, he states that he has this year taken four fresh specimens, May 17–20, at the same place, one flying in the bright sunshine shortly after noon, the others at twilight. Mr. Hopping has kindly sent me three more specimens, and I have seen two others in the collection of Mr. Fuchs, also from the same source. These specimens are all males, and I have little doubt that Mr. Hopping's entire catch is of this sex.

It is probable that Mr. Schwarz had given the species little or no study, inasmuch as no lengthy examination is needed to convince so experienced a coleopterist that it can not possibly be a *Ceruchus*. On further investigation it appears equally certain that it is not assignable to any of the known genera of the family. Scarcity of material, together with the small size of the insect, has prevented a satisfactory examination of the oral organs, a fact which makes somewhat difficult the determination of its affinity with described genera as at present classified. It is, however, questionable if the characters drawn from the ligula and maxillæ are of any greater significance than several others much more easily observable, and a knowledge of their precise form in the present instance would, I believe, throw little light on the relationship of this remarkable Californian species.

Following the classification adopted by LeConte and Horn, our species would, by the structure of the mentum, the straight antennæ, and the nearly contiguous front coxæ, fall into the Ceruchini; but the differences in other respects are too numerous and too radical to permit a

close association with *Ceruchus*, and the new form must, I think, stand as the representative of at least a new sub-tribe, which may for the present be placed between the Ceruchini and Sinodendrini.

With the exception above noted, the following generic diagnosis is believed to be sufficiently full for comparative purposes :

PHYLLOSTOMA, gen. nov.

Mentum longer than wide, narrowly rounded in front, mental suture scarcely traceable. Palpi moderate in length, their supports visible; third joint of maxillary slightly transverse, fourth fusiform and as long as the second and third combined; joints of labial palpi increasing in length. Mandibles small, with a conspicuous externally bidentate process. Head small, less than half the width, and with the mandibles but little more than half the length of the prothorax. Labrum connate with the epistoma, the suture very fine. Eyes very prominent, subglobular, not emarginate. Antennæ straight, first joint stout, elongate oval, second similar but smaller, forming with the first joint about one-third the length of the organ; joints 3–7 small, becoming transverse; club three-jointed, subequal in length to joints 3–7. Prothorax transverse, widest a little behind the middle, sides strongly rounded. Elytra a little wider than the prothorax and about twice as long, sides parallel. Front coxæ transverse, subconical and strongly prominent; middle coxæ transverse, much less prominent; hind coxæ flat. Legs long; hind femora very stout; front tibiæ strongly bidentate externally, with three or four small denticles above the upper tooth; middle and hind tibiæ not dentate, but with a transverse ridge fringed with spinules on the outer and posterior side, the apex also fringed with short, close-set spinules; tibial spurs as usual in the family; tarsi unusually long. Abdomen with six distinct segments.

P. fimbriata, sp. nov.

Elongate, cylindrical, brown, side margins of thorax and elytra fimbriate with long hairs, under surface and legs sparsely hairy. Head coarsely, rather closely, punctate; clypeus reflexed, quadridentate; front concave at middle, the concavity limited by ridges which converge backward; inner margin of the eyes elevated, especially posteriorly, and forming minute, but prominent, tempora. Prothorax convex, finely margined, a little wider than long, widest two-fifths from the base, sides strongly rounded, front angles obtuse but defined, hind angles wanting, the sides rounding into the base; surface rather finely and sparsely

punctate. Elytra finely moderately closely punctate, the surface finely but not closely rugulose, owing to the irregular coalescence of the punctures; sutural stria alone evident; disc with two costæ faintly indicated anteriorly, the punctures defining them being more nearly serial in arrangement than elsewhere. The marginal fringe consists of two series of hairs, one superior and directed upward, the other epipleural and horizontal. Prosternum carinate at middle, polished and impunctate except near the side margins. Metasternum and abdomen rather sparsely punctate.

Length, 7–7.5 mm. Width, 2.8–3 mm.

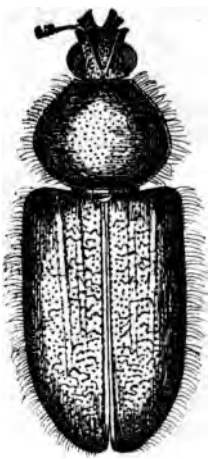


FIG. 10.

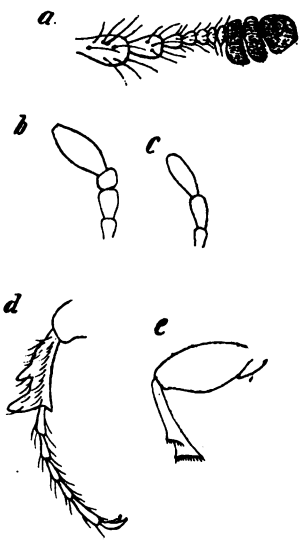


FIG. 11.

The accompanying figure (Fig. 10) represents fairly well the general aspect of the insect, but the cephalic ridges are somewhat exaggerated and the antenna is a little short. The antenna is, moreover, more correctly represented in (a) Fig. 11, while b, c, d and e illustrate respectively the maxillary palpus, labial palpus, front tibia and tarsus, and hind femur and tibia.

Platycerus latus, sp. nov.

Stout, convex, nearly black, shining. Head small, coarsely confluently punctured; mandibles small, not differing in the sexes. Scape of

antennæ nearly twice as long as the funicle, the latter slightly but distinctly shorter than the club; funicular joints, except the first, transverse, the outer ones gradually slightly wider; club three-jointed, distinctly wider in the male than in the female, its basal joint more than twice as wide as the preceding one. Prothorax large, one-half to four-fifths wider than long, widest but little behind the middle, sides strongly rounded but not angulate, deeply sinuate posteriorly, the hind angles right or somewhat acute; side margins moderately reflexed; disc closely and strongly punctate, the punctures less close toward the middle, where they are separated by from one-half to quite their own diameters. Elytra from one-third to two-fifths longer than wide, distinctly more than twice as long as the prothorax, width at base a trifle less than the latter at its widest part; disc not distinctly striate, the punctures strong, close and subserial in arrangement. Tarsi about three-fourths as long as the tibiæ in the male, scarcely more than half the tibial length in the female.

Length, 9–11 mm.

Described from 3 ♂'s and 6 ♀'s taken in Placer Co., California, and 1 ♀, apparently not different, from Alameda Co.; all collected by Dr. E. C. Van Dyke.

Latus is evidently similar in its robust convex form to *thoracicus*, Casey, but of this species Casey says: "Scape of antennæ slightly longer than the funicle, the latter a little longer than the club," while in *latus* the scape is sensibly twice as long as the funicle, and the latter is shorter than the club. In *thoracicus* the thorax is said to be widest at the basal third, which is not the case in any of the ten examples of *latus*.

The following notes, contained in a letter from Dr. Van Dyke, are of especial interest. He says, speaking of the species above described: "My Placer Co. specimens were from Forest Hill, altitude about 2,700 ft. Inasmuch as I found several about old Libocedrus stumps, and one quite well into the heart of one, I surmise that it feeds on this. I would wish to find the larvæ before being certain, though. It flies only at dusk and at night. My *P. Agassizii* were all found in broad daylight resting on leaves or wandering over tanbark oak stumps. *P. Oregonensis* and *depressus* I have caught flying in the hottest part of the day. Our two species of *Ceruchus* are both night fliers like the new *Platycerus*. Another resemblance in habit, if it should prove true that this feeds on the Libocedrus, is the fact that both species of *Ceruchus* feed on conifers. All the other species of *Platycerus* that I have observed feed on non-

coniferous trees; *P. Oregonensis* on California laurel and alder and on Madrone (Rivers); *P. depressus* on the California mountain Aspen, and *P. Agassizii* on oak, the tanbark—*Q. densiflora*—preferred, though I have found it on the live oak—*Q. agrifolia*."

NEW DIURNAL LEPIDOPTERA FROM BOLIVIA.

BY A. G. WEEKS, JR., BOSTON, MASS.

(Continued from page 269.)

Pedaliodes primera, sp. nov.

Habitat: Bolivia, near Cusilluni. Expanse, 2.25 inches.

Head and palpi, dark brown, nearly black. Antennæ, above, nearly black; beneath, dark rust colour. Legs, brownish. Thorax, black with brownish hairs. Abdomen, the same but lighter beneath.

Upper side of fore wings, entirely dark blackish brown. The hind margins are dentated, especially so on lower wings. The marginal interspaces of fore wings have a prominent white thread.

The ground colour of under side of fore wings is dark brown. The marginal interspaces have a prominent white thread. There is a silvery-white dash near apex, starting on costa, practically at the apical point, extending towards base for one quarter inch and suffusing into the wing for one quarter inch. Below this is an interspacial white speck. Nearer the base, one sixteenth inch inwards from this silvery-white area, the subcostal interspaces show whitish owing to a generous dashing of white scales. The discoidal space is rather light rusty brown, suffusing into lower interspaces. Under the first disco-cellular nervule, practically in the centre of hind marginal area, is a rusty circle, one quarter inch across, of same colour as discoidal space. Inner margin is somewhat grayish.

Ground colour of under side of hind wings is dark brown with dashes and wavy lines of silvery white, hard to describe accurately. The lower third of the wing, covering anal angle area, is heavily covered by silvery-white scales, and between the second and third median nervules, one-third inch from hind margin, is a prominent white dot, repeated in next lower interspace, but smaller. Above the anal area which bears the silvery-white scales, and inwards toward base, the ground colour is

transversely crossed by a more or less prominent series of silvery-white wavy lines, interspacial. Midway between base and apex on costa, is a prominent dash of silver white, repeated directly below in the next subcostal interspace, and half way from this to base is another dash of silvery white. The discoidal space at its outer portion has two patches of silver-white scales, the balance of the space being of the ground colour, with a suggestion of silvery-white, transverse, wavy lines. The interspaces, one-quarter inch within hind margin, bear a white speck, wanting in some specimens, but fairly prominent in others.

The general marking of under side varies greatly in the eight specimens in my collection. The prominent and most regular markings are the silvery-white space near apex of fore wings, the rust colour of discoidal space (which in some specimens suffuses very generously into adjoining interspaces), the subcostal silvery-white dashes on hind wings, and the silvery-white anal area with the interspacial white dots.

Taken near Cusilluni in May, 1899, and although one or two specimens have been found in European collections, I believe no description has ever been published.

Thecla Harrietta, sp. nov.

Habitat: Bolivia, near Corioco. Expanse, 1.50 inches.

Head, thorax and abdomen above, dark, covered with green-blue hairs; below, dark mouse colour. Antennæ, black. Legs, dark mouse colour, tarsi having white annulations at base of each joint.

Fore wings, above, dark lustrous blue. Basal area dusted with greenish blue. Hind margin with a slight fringe of black hairs, and edged with a black thread. A slight suffusion of black extends one eighth inch inwards from hind margin.

Lower wings, above, dark lustrous blue, matching fore wings. Hind margin, same as on fore wings. At anal angle is an addition to the wing area, one sixteenth inch wide, running from angle to lower submedian nervule (black suffusing somewhat into wing area) and then extending outwards as a tail at nearly right angles to the nervule. This tail is black, one quarter inch long. Across this anal black space is a bluish-white thread, running from end of lower submedian nervule straight to the submedian nervure, then forming a "V" in inner marginal space. At the end of the second submedian nervule is another tail, black, one eighth inch long, being a continuation of the nervule in its direction.

Under side of fore wings, mouse colour. Hind margin edged with a black thread. Starting at second subcostal nervule at a point one quarter distance from apex to base, is a jet-black line, running downwards parallel to hind margin, and ending at lower submedian nervule. Three sixteenths inch within this line is another running from costa to lower submedian nervule, not quite parallel to the first line but approaching it somewhat at its lower part; at the lower submedian nervule this line turns at a right angle and crosses inner marginal space. Across end of discoidal space is a black line. Nervures and nervules are somewhat darker than ground colour.

Under side of hind wings same colour as fore wings. Hind margin edged with a black thread. Beginning at costal nervure at a point one third distance from base to apex is a heavy jet-black line running downwards, *towards* anal angle, crossing subcostal nervure at its junction with first subcostal nervule, and ending at median nervure. Outside of this about one eighth inch, is a second heavy jet-black line, starting at first subcostal nervule, and running down to lower submedian nervule, striking it one eighth inch above hind margin. Another similar line starts at apex and runs downwards, one quarter inch within hind margin, joining the last-metioned line at lower submedian nervule. Betwixt this and hind margin, but much nearer the margin, is a black line, scarcely visible at apex, but becoming more prominent as it approaches anal angle. The area at lower angle described on upper surface is black, the tails also. The blue line crossing it is the same as on upper surface. Just above this, in interspace, above submedian nervure, is a black line forming a circle, dusted with blue at its lower inside edge. In the inner marginal space are two parallel black threads, starting near base and crossing downwards to submedian nervure; the first is edged with blue on its lower side, the second edged with blue on its upper side. The nervures and nervules are black.

Type.—One specimen, taken April 19th, 1899.

Pyrrhopygopsis Reedii, sp. nov.

Habitat: Bolivia, Cochabamba District. Expanse, 2.05 inches.

Head, antennæ and legs, black. Thorax, black, with an orange spot at each shoulder. Abdomen, black, with a tawny tip.

Fore wings, above, entirely black excepting a slight dusting of orange scales on costa. Hind margin, fringed with orange hairs, short at apex, but lengthening at lower angle.

Hind wings, the same as fore wings, the orange fringe extending from upper angle to anal angle is more prominent than on fore wings.

Under side of both wings, of dark bronze. The lower half of discoidal space, darker, the dark suffusing into three lower interspaces. Nervules and nervures, black. Hind margin fringed with orange, same as on upper side.

Under side of hind wings, the same, except the darker area borders the inner margin, one eighth to one fourth inch wide, not intruding on discoidal space.

Described from species taken five days' travel north from Cochabamba. It is very near *P. tenebricosa*, Hew., except in the cilia, which is orange instead of pure white.

Pamphila argentea, sp. nov.

Habitat: Bolivia; Cusilluni District. Expanse, 1.20 inches.

Head, thorax, antennæ, abdomen and legs, bronzy-brown above; more grayish beneath.

Upper side of fore wings, bronzy brown. In subcostal interspaces, at apical area, are two whitish dots. Just above the second subcostal nervule, is a larger dot, and in interspace below, somewhat nearer base, is another still larger one, with its upper part nearer the hind margin than the lower part. In interspace below, is another longitudinal spot, of nearly similar size, resting on submedian nervure.

Upper side of hind wings, bronzy brown. In discoidal space is an indistinct lightish space, and running from near upper angle across the wing to near centre of inner margin, is a row of lightish interspacial dots, five or six in number.

Under side of fore wings, dark brown, central portion of hind margin being dashed with lighter scales. The whitish spots of upper surface are repeated.

Under side of hind wings, rich dark brown. In discoidal space is a prominent spot of silvery white. From upper angle across the wing to near the centre of inner margin is a row of silvery-white interspacial spots. These spots are very prominent, forming the noticeable marking of under side. Along hind margin of both wings, within the hairy fringe, is a dark thread.

Taken near Cusilluni in May, 1899.

NEW BEES OF THE SUBFAMILY ANTHOPHORINÆ FROM SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, E. LAS VEGAS, N. M.

(Continued from page 287.)

Anthophora catalinæ, n. sp.— ♀. Length 14 millim., black (including face, mandibles and antennæ), with fulvous, yellowish-white and black pubescence. Pubescence of face dull yellowish-white, a few black hairs at the sides of the clypeus, a long pale fulvous tuft on each side of the anterior ocellus; hair of vertex long, erect and black, of occiput yellowish-white, of cheeks yellowish-white above and white below; hair of thorax pale fulvous, mixed with black on mesothorax and scutellum; lower half of pleura clothed with black hair; abdomen with dense pale fulvous hair-bands at the apices of the first four segments; apex with black hair; ventral surface of abdomen with black hair, except at the sides, where the pale apical bands of the upper surface are combined for a short distance; legs clothed beneath with black hair, above largely with pale; fringe of anterior tarsi wholly black; long hair on outer side of hind tibia and basal joint of tarsus black on the anterior half (extending longitudinally) and shining very pale yellowish on the posterior half.

Structure of *A. urbana*, Cresson, of which it is the insular representative.

Hab.—Catalina Island, California, Aug., 1901. *(Wilmatte P. Cockerell.)*

This bee differs strikingly in colour from *A. urbana*, which is common on the mainland. I found ordinary *urbana* flying on July 8th at San Pedro, which is on the coast nearly opposite Catalina.

Melissodes personatella, n. sp.— ♂. Length 10 millim.; black; head much broader than long, facial quadrangle somewhat narrowed below; *face entirely black*, covered, as also the cheeks, with long white hair; mandibles black, with a ferruginous subapical spot; vertex on each side of the ocelli concave, smooth and shining, with minute, hardly noticeable punctures; *antennæ very long*, reaching to apex of second abdominal segment; scape short and stout, black; flagellum ferruginous beneath, second joint considerably longer than third; mesothorax shining and sparsely punctured, thinly clothed, as also the scutellum, with long black hair; hair on prothorax, pleura, post scutellum and metathorax

long and white; tegulæ very dark brown; wings rather short, slightly dusky, more hairy than usual, nervures piceous; first recurrent nervure received by second submarginal cell not far from its end; third submarginal narrowed a little more than half to marginal; legs black, with white hair, small joints of tarsi becoming ferruginous; abdomen with short black hair, except on the first segment and extreme base of second (where it is white), at the apex (where it is pale), and clear white bands of hair near the apical margins of segments two to five; the first segment has some black hair dorsally near its apical margin; apical plate truncate, not notched at the sides.

Hab.—La Jolla, San Diego Co., Calif., August, 1901. A very distinct species, by its black face, black hair on mesothorax, and long antennæ. For some account of other species with black faces in the male, see Entom., Oct., 1896, p. 304.

NOTES ON THE EARLY STAGES OF CATOCALÆ.

BY G. M. AND E. A. DODGE, LOUISIANA, MO.

(Continued from page 226.)

Catocala retecta, Grt.

Food-plant, hickory. Length of mature larva, two and one-half inches. Head rather flat, as broad as first segment, gray striped with dark brown, and with a broad black band, ragged in front, running up each side to top of lobe, but not continued over the summit.

The dorsal stripe consists of a series of rounded, brown patches with a black central line; tubercles, although not large, tipped with white, and conspicuous; subdorsal stripes brown, interrupted and indistinct.

The thoracic segments are blackish; on the fourth segment a pale brown band, much lighter than the general colour, crosses the body; the central segments are also blackish, but a shade paler than the first three; there is a slight black transverse ridge on the eighth segment, and the anterior part of this segment is pale brown like the fourth; the remainder of the eighth segment and all following are as black as the thoracic segments, except that the pale brown dorsal stripe is unusually developed on the eleventh segment. Filaments whitish, very numerous, simple and hair-like, but not very long. Venter white, tinged with pink, with large

black spots on all except the thoracic segments and segments eight and nine.

Catocala piatrix, Grt.

Larva taken on walnut, July 9, 1901. Length, two and seven-tenths inches. Colour pale gray, head the same, face dusky, bounded by a black stripe which passes over the summit and down each side to the mouth, the sides of head behind this stripe being pale gray. A rather broad, brown, continuous dorsal stripe. Cervical shield dark like the face, anal plate greenish. Brown stripes enclosing the dorsal tubercles are darkest on posterior part of each segment, where they are marked with short diagonal gray lines. Lateral stripes faint. Stigmatal stripes dark brown and distinct, fading on central segments. No filaments. Tubercles all very small and white, legs greenish.

Venter white, with a black spot on each segment except that bearing last pair of abdominal legs.

Catocala neogama, S. and A.

Described June 2nd. Food-plant, walnut. Head wide as thoracic segments, gray, as is also segment one; head with many dark brown markings; jaws black and a black patch at each side of the mouth.

Tubercles whitish, those on eleven quite large, ridge of eight slight. Dorsal median stripe very irregular; on the thoracic and anal segments its sides are nearly straight and closely approximate, on the central segments it alternately widens and contracts, forming a series of dumb-bell-like figures.

The subdorsal stripes are of the general colour, which is wood-brown, except on segment four, where they are black, and also on segment eight, where they form part of the transverse black band, which latter is divided by the dorsal stripe.

The stigmata are black and like in the dark brown stigmatal stripe, which is connected with the subdorsal stripes by dark diagonal lines on each of the central segments.

Filaments simple, not numerous. Legs pale, spotted with black and white. Venter strongly tinged with red and with black spots, except between thoracic and last two pairs of abdominal legs, where the spots are brownish red or, in some cases, obsolete.

Neogama larvæ vary in depth of colour, but the markings are quite constant, so far as observed, and we have bred many of them.

Piatrix larva may be recognized from its earliest stage, showing the

markings of the mature larva, but it also varies somewhat in depth of colouring.

The most constant of all is the larva of *illecta*, which at any stage after the first day or two may be recognized by its black and white, narrow and transverse stripes, its broad, white stigmatal stripe, and the spots, like red sealing-wax, which ornament each segment.

We bred over one hundred *illecta* this year, and noted no variation in either larva or imago.

NEW SPECIES OF EVANIIDÆ.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DEPARTMENT OF INSECTS, U. S. NATIONAL MUSEUM.

Mr. J. Chester Bradley has begun, in the May number of the "Entomological Student," a monographic revision of the *Evaniidæ* of North America, a work badly needed by our students.

On learning from me that I had several new species in this family, he has requested that I should publish them at once, so that they may be incorporated in his monograph, which will be published in the Transactions of the American Entomological Society of Philadelphia.

I begin, therefore, by publishing three new species in Abbe Provancher's rare genus, *Pammegischia*, a genus suppressed by Dr. Schletterer, but revived in my classification of the superfamily Ichneumonoidea.

It is interesting to record that the habits of this genus are quite different from other Evaniids; Dr. E. P. Felt, State Entomologist of New York, having bred a species from the larvæ of a horn-tail *Xiphydria Provancheri*, Cresson.

Mr. Bradley has done me the honour to accept my ideas on the classification of the *Evaniidæ*, but has been unfortunate in not paying more attention to the characters used in separating the genera, for he has placed in the genus *Aulacus* species which should be placed in Abbe Kieffer's genus *Pristaulacus*, viz., *Aulacus occidentalis*, *A. melleus*, *A. pacificus*, *A. rufitarsis*, *A. fasciatus*, *A. firmus*, *A. resutorivorus*, *A. Abbottii*, *A. stigmaterus* and *A. pallipes*.

Pammegischia xiphydriæ, sp. nov.

♀.—Length, 7.5 mm.; ovipositor about two-thirds the length of the abdomen. Black, with the first segment of abdomen red, the second

joint of front trochanters, the middle trochanters and basis of their tibiæ testaceous, the rest of the legs remaining black (all being broken off about the middle of the tibiæ). The head is quadrate, above smooth and highly polished, with only a few scattered punctures; in front, below the front ocellus to the insertion of the antennæ, it is transversely rugulose; face beneath the antennæ, except the lower inner angles of the cheeks, which are smooth and polished, is closely irregularly punctate; mandibles black, with a rufo-piceous tinge; while the palpi are fuscous. The thorax is rugosely punctate, the mesonotum with numerous transverse ridges and with complete parapsidal furrows. Wings almost hyaline or only faintly tinged, the stigma and veins being black or brown-black, the first recurrent nervure being received by the first cubital cell at about the middle, the second recurrent nervure received by the second cubital cell a little beyond its middle, while the third cubital cell is more or less divided into two by a spurious stump of a vein which originates from the cubitus a little before the apex of the second recurrent nervure. All coxæ are black and rugulose, the hind pair being elongate and produced beneath at apex into a triangular process that extends far beyond the insertion of the trochanters. The abdomen is highly polished, impunctate, except at the extreme base, and is shaped as in *Aulacus*, only it is not so distinctly petiolate; the first segment occupies fully half the whole surface of the abdomen.

Type.—Cat. No. 5782, U. S. N. M.

Hab.—Saranac Inn, New York.

Host.—Hym.: *Xiphydria Provancheri*, Cresson, living in birch. Bred by Dr. E. P. Felt, State Entomologist of New York.

Pammegischia Lovei, sp. nov.

♀.—Length, 4 mm. Ferruginous; eyes, mesonotum, base of metathorax, hind coxæ toward apex, the flagellum and the ovipositor, which is a little longer than the abdomen, brown or brown-black; all femora and the hind tibiæ, except at base, dusky, rest of legs honey-yellow. Wings hyaline, the subcostal vein brown, the stigma and rest of veins pale ferruginous.

Type.—Cat. 5857, U. S. N. M.

Hab.—Palisades, New Jersey. Taken in May by Mr. E. E. Love.

Pammegischia Weedi, sp. nov.

♂.—Length, 5.5 mm. Black; face below insertion of antennæ, mandibles except teeth, first joint of antennæ, first segment of abdomen

except extreme base and apex, and legs except coxæ, pale ferruginous or honey yellow.

Antennæ straight, as long as the body; brownish and 13-jointed, the second and third flagellar joints subequal, nearly twice as long as the first. The head is nearly smooth, the face below the front ocellus transversely rugulose, the cheeks feebly punctate; the thorax is rugoso-punctate, the mesonotum with coarse transverse rugæ; the abdomen is smooth and polished, the three or four terminal segments at apex and the claspers being rufo-piceous, while the wings are hyaline, with the stigma and veins ferruginous.

Type.—Cat. No. 5858, U. S. N. M.

Hab.—Hanover, New Hampshire. Captured by Dr. Clarence M. Weed.

HYPTIA *Illiger.*

Hyptia Fuchi, new species.

♂.—Length, 5.5 to 6 mm. Ferruginous, the abdomen, except the petiole or first segment, being black; the forehead from the ocelli to the base of the antennæ, except the orbits, is black or blackish; the pro-mesosternum, the meso- and metapleura, all coxæ except the hind pair toward apex beneath, the trochanters and the hind legs, are black, while the middle femora above and the hind tibiæ toward apex, and the flagellum, except the three or four basal joints beneath, are fuscous. Wings clear hyaline, without cells, the stigma, the costal and subcostal and the median veins being brownish-black.

Type.—Cat. No. 6075, U. S. N. M.

Habitat.—San Jose del Cabo, Baja, California.

Described from 2 ♂ specimens received from Mr. Charles Fuch.

Hyptia Weithi, new species.

♂.—Length, 5 mm. Black and coarsely closely umbilicately punctate, the metapleura coarsely reticulate, the scape, the prothorax, upper part of the mesopleura anteriorly, the mesonotum, the scutellum, the anterior legs from apex of coxæ, and the middle tarsi, testaceous; rest of legs black. Wings hyaline, the veins black, the discoidal cells entirely obliterated.

Type.—Cat. No. 6076, U. S. N. M. (Ashmead Collection).

Habitat.—Hayti.

Described from a single specimen received from Mr. R. J. Weith.

Hyptia Trinidadensis, new species.

♂.—Length, 3.5 mm.—Black; the head except the face below the antennæ, the mesonotum and the mesopleura, are smooth, polished and impunctate; the metathorax is rather closely punctate, the metapleura more coarsely punctate; the face below the insertion of the antennæ is rather finely punctate, and one may detect a few small punctures on the forehead; the antennæ, except some dark stains at the apex of the joints, the front coxæ, their femora beneath and their tibiæ and tarsi, middle trochanters except at apex, an annulus at base of their tibiæ, the hind coxæ except at apex, base of first joint of trochanters, all tibial spurs, and an annulus before the apex of the abdominal petiole, all yellow-testaceous; rest of legs black. Wings clear hyaline, the stigma and veins brownish-black, the discoidal cells wanting.

Type.—Cat. No. 6077, U. S. N. M. (Ashmead Collection).

Habitat.—Trinidad, W. I.

Described from a single specimen.

Hyptia Floridana, new species.

♂.—Length, 2.5 to 2.75 mm. Wholly black, except the sutures of the joints of the middle and front legs, their tarsi and all tibial spurs, which are testaceous. The head and the mesonotum are distinctly punctate, but more sparsely punctate on the vertex and on the disk of the mesonotum; the mesopleura anteriorly are smooth and polished, while the metathorax, except sparsely on the disk, is coarsely umbilicately punctate. Wings hyaline, the tegulæ yellowish, the veins brownish.

Type.—Cat. No. 6078, U. S. N. M. (Ashmead Collection).

Habitat.—Jacksonville and Biscayne Bay, Florida.

Described from 2 specimens. The specimen from Biscayne Bay was collected by Mrs. Annie Trumbull Slosson.

Hyptia Johnsoni, new species.

♂.—Length, 5 mm. Black, except the metanotum above and surrounding the abdominal petiole. The head and thorax are distinctly but not closely punctate, the punctures being separated; the face has a sericeous pubescence; the mesopleura are smooth, polished and impunctate, except a few, minute, faint punctures toward the coxæ; while the wings are hyaline, without discoidal cells, the tegulæ and the veins being black or brown-black.

Type.—Cat. No. 6079, U. S. N. M. (Ashmead Collection).

Habitat.—Philadelphia, Pa.

Described from a single specimen received from Mr. C. W. Johnson.

EVANIA *Fabricius.*

Evania Neomexicana, new species.

♂.—Length, 3.5 mm. Black, the metathorax at apex and sometimes the mesopleura below, rufo-testaceous; the head and the mesonotum are shining and only sparsely punctate; the mesopleura superiorly are smooth and impunctate, but posteriorly they are lineate, and below, or toward the mesosternum, they are sparsely punctate; while the metathorax is rather coarsely and irregularly reticulate. Wings hyaline, the tegulæ, stigma and veins being black or piceous, the internal veins sometimes brown.

Type.—Cat. No. 6080, U. S. N. M.

Habitat.—Las Cruces, N. Mex.

Described from 2 specimens received from Prof. T. D. A. Cockerell.

Evania Californica, new species.

♂.—Length, 4.6 mm. Black, the face around the insertion of the antennæ, the clypeus, the mandibles, the sutures of the trochanters, the tibial spurs, front knees, base of front and middle tibiæ and the sutures of their tarsal joints or the front tarsi beneath, testaceous or brownish. The head and the thorax above are smooth and impunctate, or at most with only a few minute, scarcely perceptible punctures; the prothorax at the sides is lineate; the mesopleura, except a small, smooth spot, are reticulate and lineate superiorly, while the metathorax, except *above*, is rather coarsely reticulate. Wings hyaline, the tegulæ testaceous but browish basally, the veins being brown-black.

Type.—Cat. No. 6081, U. S. N. M.

Habitat.—Natoma, Southern California.

Described from a single specimen taken by Mr. Albert Koebele.

Evania unicolor, Say.

This species I have recently recognized, and it is certainly distinct from *E. appendigaster*, Linne, although agreeing with it very closely in size and colour. It was described by Say long before railroads were built and before *Evania appendigaster* could have reached the interior of the country.

It is readily separated from *E. appendigaster* by punctuation and sculpture, the head being distinctly punctured and clothed with a sericeous pubescence, whereas in the former it is smooth and impunctured.

NOTES ON THE BUTTERFLIES OF SIOUX COUNTY, NEBRASKA.

BY MERRITT CARY, NELIGH, NEB.

While connected with expeditions sent out by the Department of Entomology and Ornithology, University of Nebraska, it has been the writer's good fortune to spend a portion of the summers of 1900* and 1901† in the extreme north-western corner of Nebraska in collecting the insects, birds and mammals of the region. Naturally the butterflies, the study of which has been something of a "hobby" with him for some years past, came in for no little share of attention.

That a region so interesting as Pine Ridge and the Hat Creek and White River Basins are geologically, is also of the greatest interest as regards its zoogeography and phytogeography, goes without saying. The general topography of a region, whether it be a high plateau, deeply cleft by numerous well-wooded canons, or a prairie region containing large areas of bad lands and buttes, cannot fail to have its effect upon the distribution of life, and to leave a strong impress upon the indigenous fauna and flora. Both of these conditions obtain in north-western Sioux County.

Pine Ridge, which reaches an altitude varying from 4,000 to 5,000 feet above sea level, crosses the Wyoming-Nebraska line about fifteen miles south of the north-western corner of Nebraska, and runs in a south-easterly direction through the northern part of Sioux County. On the north side the Ridge is broken up into numerous deep and well-wooded canons, and slopes abruptly into the Hat Creek Basin, 1,300 feet lower.

The latter region consists of a rolling prairie, well watered by a large number of small streams which have their sources in the canons on the north slope of Pine Ridge, and embraces large areas of bad lands and buttes.

The yellow pine *(Pinus ponderosa)* is the prevailing forest tree, and

* In 1900 the expedition was encamped in Monroe Canon, Sioux County, during the last two weeks in May, and consisted of Prof. Lawrence Bruner, J. C. Crawford, Jr., and J. S. Hunter, of the University of Nebraska, besides the writer.

† In 1901, two months, beginning with May 25th and ending with July 27th, were spent in the region, with a base camp in Warbonnet Canon, by M. A. Carriker, Jr., and the writer. Prof. Bruner and J. C. Crawford, Jr., spent a week or two each in the region.

clothes the canon sides, although in the bottoms of canons such trees as aspen, black birch, box-elder, cottonwood and a few elms fringe the streams.

It will readily be seen that the Ridge, while on the border line between the Upper Austral and Transition life zones, contains a great many elements of the latter. Among the breeding birds which belong to the Transition are Audubon's Warbler, Lewis's Woodpecker, Sharp-shinned Hawk, Western Warbling Vireo, and Solitare; among the mammals usually occuring in the Transition may be mentioned the Yellow-haired Porcupine, Black-tailed Deer, and Beaver.

The semi-mountainous area has also a corresponding effect upon the insect fauna, and accounts for the presence of a large number of western species. The occurrence of *Argynnis hesperis*, *Phyciodes camillus pallidus*, *Satyrus charon*, *Colias Alexandra Edwardsii*, *Lycaena antiacis*, *L. sagittigera*, and *L. acmon**, *Papilio zolicaon*, *P. indra*, and *P. rutulus*, *Terias Mexicana*, and *Pamphila rhesus* in north-west Nebraska will no doubt be something of a surprise to eastern lepidopterists.

Danais plexippus, Linn.—Battered specimens numerous, but no fresh ones taken until July 10 to 25, when a new brood appeared.

Euptoieta claudia, Cramer.—Flying all the time I was in the region. Especially abundant in the Bad Lands.

Argynnis cybele, Fabr.—Common on *Monarda* blossoms in the canons, July 10 to 27.

Argynnis aphrodite, Fabr.—Several examples taken in July.

Argynnis aphrodite, var. *cypris*, Edw.—The most abundant Argynnid, flying abundantly from June 25 until July 27. Fresh specimens were taken until July 15, after which battered specimens were the order. *Cypris* was taken in the canons, on *Monarda*.

Argynnis aphrodite, var. *alcestis*, Edw.—A very few taken in valley meadows.

Argynnis hesperis, Edw.—Four examples of this species were taken in the middle of July, on *Monarda*. They are not typical, however, the apical half of the under side of the fore wings being heavily clouded with dark ferruginous, and the under side of secondaries very dark.

Argynnis coronis, Behr. (?).—A number of examples of an Argynnid

* On August 12th of the present year the writer took several examples of *acmon* at Neligh, in north-eastern Nebraska.

were secured which are very close to *coronis*, and I temporarily refer them here.

Argynnis Nevadensis, Edw.—A number of examples on Thistle, June 25 to July 15.

Argynnis Nevadensis, var *Meadii*, Edw.—Frequenting Thistles on the Divide and damp places in the canons, June 25 to July 15. Appears to be more of an upland species than any of the preceding Argynnids.

Argynnis Edwardsii, Reak.—This beautiful species was very numerous on the Divide from June 20 to July 10, feeding on Thistle blossoms; and from July 10 to 25 on *Monarda* in the canons. *Edwardsii*, *Meadii*, *Nevadensis* and *cypris* were frequently taken on damp ground around springs.

Argynnis eurynome, Edw.—On *Monarda*, July 5 to 27. Frequent examples.

Argynnis myrina, Cram.—Damp meadows in the valley, June 27 to July 20.

Melitæa sp.—A species of *Melitæa* which is close to *Editha* of California was very abundant on the Divide and grassy slopes of the Ridge from May 25 to June 5.

Melitæa minuta, Edw.—Two examples from damp ground in Warbonnet Canon, June 5 and July 22. In 1900 a number of specimens of *minuta* were taken.

Phyciodes nycteis, Dbl.-Hewit.—Monroe Canon in 1900, common.

Phyciodes ismeria, Bdl.-Lec.—Frequently captured in July.

Phyciodes ismeria, aber. *nigra*, n. aber.

♂—Expands 1.25 in.

Upper side black, lightly spotted with fulvous and pale ochraceous. Disc of primaries crossed by two irregular bars of fulvous, the basal bar broadest and nearly severed in the middle of the basal side by a narrow black area; the second one narrowly sinuate on right primary and a narrow straight line on the left one. The broad and sinuous discal series present in *ismeria* is entirely lost; extra-discal series consists of seven whitish ochraceous spots, the three nearest the costa being small and round, the fourth with a long, narrow prolongation towards the margin, fifth round-oblong and greatly enlarged, but the end nearest the margin concave; sixth and seventh spots large and irregular, the outer portion of the latter about two millimeters from inner angle. Basal portion of secondaries faintly suffused with fulvous scales; discal series faint;

second series large and enclosing round black dots; submarginal lunules entirely lost. Fringes black and white.

Under side fulvous on basal portion of the disc of primaries, outer portion of disc black; costa and portion of apex suffused with fuscous; sixth and seventh spots of extra-discal series fulvous; second bar across disc enlarged. Marginal arrow points much as in *ismeria*. Basal portion of secondaries greatly suffused with fuscous; sinuate discal band as well as extra-discal portion of wing similar to *ismeria*, but former much narrower.

This peculiar melanistic aberration was taken on damp sand in the bottom of Monroe Canon, June 10, 1901. It was in company with several typical specimens of *ismeria*.

Phyciodes tharos, Dru.

Winter form *marcia*, Edw.—Common in the canons, May 25 to July 1.

Summer form *morpheus*, Fabr.—Abundant, June 10 to July 27.

Phyciodes camillus, var. *pallidus*, Edw.—One example taken July 7 on *Symphoricarpos*.

Grapta interrogationis, var *Fabricii*, Edw.—Taken by J. C. Crawford, Jr., June 23.

Grapta comma, var *Harrisii*, Edw.—Frequently taken on the logs at an old sawmill; also on dead branches and trunks of trees in the canons, June 20 to July 29.

Grapta zephyrus, Edw.—The most abundant species of *Grapta*. Taken in same situations as two preceding species.

Grapta progne, Cram.—General in 1900. Monroe Canon.

Vanessa antiopa, Linn.—Infrequently met with.

Vanessa Milberti, Godt.—Four examples were taken during the fore part of June, three in Warbonnet Canon and one in an alkali meadow in the Bad Lands.

Pyrameis atalanta, Linn.—Common.

Pyrameis Huntera, Fabr. — Three examples late in July on *Monarda*.

Pyrameis cardui, Linn.—Extremely abundant from June 18 to July 27.

Junonia cœnia, Hüb.—One battered specimen on *Symphoricarpos*, July 20.

Limenitis Weidemeyerii, Edw.—Common from June 1 to July 15.

Weidemeyerii was usually taken around chokecherry, but it was extremely difficult to secure specimens in perfect condition.

Limenitis misippus, Linn.—A few were secured.

Apatura celtis, Bd.-Lec.—Males were flying abundantly on July 1, and females a week or so later. This species would frequently alight on my hands or head as I was passing clumps of dead brush in the canons.

Anæa andria, Scud.—A single specimen was observed at Crawford, July 27.

Neonympha eurytus, Fab.—Abundant, July 2 to 27.

Cœnonympha ochracea, Edw.—Flying abundantly, both on the Divide and in the canons, from May 25 to June 30.

Neominois Ridingsii, Edw.—From June 20 until July 15 this species was common on the Divide.

Satyrus alope, var. *nephele*, Kirby.—About a dozen perfect examples were secured in the latter part of July in the canons.

Satyrus Meadii, Edw. (?)—On July 19 Mr. Carriker reported having seen a Satyr with a large brick-red patch on each front wing.

Satyrus charon, Edw.—Common in the sage brush, July 2 to 20.

Chionobas chryxus, Dbl.-Hewit.—On Divide, May 25 to June 20, abundant.

Libythea Bachmani, Kirtl.—One example secured July 21 on *Symphoricarpos*.

Thecla melinus, Hüb.—July 15 to 29, abundant.

Thecla acadica, Edw.—Several taken in latter part of July.

Thecla liparops, Bd.-Lec.—Abundant on wild grape, same date as last.

Thecla eryphon, Bd.—A few secured in May.

Thecla titus, Fabr.—Common in July on grapevines.

Chrysophanus rubidus, Behr.—Taken on Yarrow, July 3 to 27.

Lycaena lycea, Edw.—The most abundant "blue." On the Divide this species frequented the flowers of a lupine. In the canons it was taken in damp places. Flying May 25 to July 29.

Lycaena antiacis, Bd.—May 19 to June 1, 1900, common. But two examples were secured in 1901.

Lycaena sagittigera, Feld.—Common in 1900, rare in 1901.

Lycaena shasta, Edw. (?)—A number of small *Lycaenas* were taken on gravelly exposures on the Divide early in July which appear to be much nearer *shasta* than *Scudderii*, and I temporarily refer them here.

Lycaena melissa, Edw.—Abundant in the canons, May 25 to July 15. Taken also in the Bad Lands.

Lycaena acmon, Dbl.-Hewit.—Bad Lands, May 25 to June 10. Also one July 27.

Lycaena pseudargiolus, Bd.-Lec.

Var. *marginata*, Edw.—Several examples in 1900.

Var. *violacea*, Edw.—A single ♀ in July, 1901.

Lycaena amyntula, Bd.—Common in latter part of May and early in June.

Lycaena comyntas, Godt.—Early in June, rare.

Lycaena isola, Reak.—Nearly a dozen examples were captured on damp sand in the canons, June 24 to July 29.

Neophasia menapia, Feld.—Flying abundantly about the tops of pines late in July.

Pieris sisymbri, Bd.—Several in 1900.

Pieris protodice, Bd.-Lec.—Common.

Pieris napi, var. (?)—One secured.

Pieris rapae, Linn.—But two examples were taken.

Nathalis iole, Bd.—Several seen late in June.

Anthocharis ausonides, Bd.—A single specimen in 1900, and one again in July, 1901.

Colias cæsonia, Stoll.—One seen July 10.

Colias eurytheme, Bd.—Abundant.

Colias philodice, Godt.—A number in May and again late in July.

Colias philodice, var. *anthyale*, Hüb.—Mr. J. C. Crawford, Jr., secured a single example of this small variety in 1900.

Colias Alexandra, Edw.—Abundant on the Divide, May 25 to June 20. Females flying June 10 to 20.

Colias Alexandra, var. *Edwardsii*, Behr.—I secured two males in 1900.

Terias Mexicana, Bd.—On *Verbena hastata*, July 14. One specimen.

Parnassius smintheus, Dbl.-Hewit.—Frequenting gravelly exposures on the Divide, June 4 to July 6. Feeding on *Sedum stenopetalum*.

Parnassius smintheus, var. *hermodur*, H. Edw.—On June 27, Mr. Crawford secured an extremely dark ♀, which I shall refer here for the present.

Papilio Bairdii Oregonia, Edw.—I secured a battered ♂ on a high butte, July 12.

Papilio zolicaon, Bd.—Common in 1900, but rare in 1901. This and the following species were usually found around the rim-rock, seldom in the canons.

Papilio indra, Reak.—Two examples in 1900, one in 1901.

Papilio polyxenes, Fabr.—One specimen.

Papilio turnus, Linn.—Uncommon.

Papilio turnus, var. *glaucus*, Linn.—One seen July 22.

Papilio rutulus, Bd.—Several seen and one secured on *Pentstemon*, July 10.

Papilio daunus, Bd.—The common *Papilio* of the region. Usually seen in the canons on hot days.

Thymelicus Edwardsii, Barnes.—A species of *Thymelicus* which appears to be somewhat intermediate between *garita* and *Edwardsii*, but much nearer the latter species, was flying abundantly over the prairie on the Divide from June 26 to July 15.

Pamphila taxiles, Edw.—On *Monarda*, June 29 to July 27.

Pamphila rhesus, Edw.—One example on the Divide, May 22, 1900.

Pamphila uncas, Edw.—Common on flowers of *Opuntia* in June.

Pamphila sp.—On *Monarda* and grapevines.

Pamphila metacomet, Harr.—Several secured on *Monarda*, same dates as last.

Pamphila metacomet, var. *vestris*, Bd.—Fairly abundant.

Pamphila sp.—Not determined.

Pamphila hianna, Scud.—Several examples in 1900.

Pamphila sp.—Not specifically determined.

Amblyscirtes vialis, Edw.—Frequently taken in June.

Pyrgus montivagus, Reak.—Abundant in the sage brush.

Nisoniades martialis, Scud.—Damp places in the canons.

Nisoniades sp.—A few were taken in similar situations to the preceding.

Pholisora catullus, Fabr.—Abundant in July.

Eudamus pylades, Scud.—Monroe Canon late in May, 1900.

Eudamus tityrus, Fabr.—Abundant.

A REPLY TO DR. WASMANN.

BY THOS. L. CASEY, VICKSBURG, MISS.

Truth may be likened to a bull's-eye—it is much more difficult to hit than to miss. The "splitters" frequently throw their shots too high and the "lumpers" too low, and there are many other sources of aberration which cause the careless worker to miss the bull's-eye. It has sometimes been my misfortune to aim a little too high in monographic work, where the familiarity engendered by long and close investigation may have led to the assignment of too great weight to certain differential characters, but, in the case of the genera allied to *Homœusa* (Journ. N. Y. Ent. Soc., VIII., p. 53), I feel myself obliged to dissent from the views advanced by Mr. Wasmann in the September number of this journal.

Myrmobiota differs so completely in habitus from *Homœusa*, that it is only by considering the general characters of the group that it can be discovered to be allied in any way to that genus. *Soliusa* resembles *Homœusa* in general habitus, but differs profoundly in abdominal structure, the basal tergites being strongly constricted at base in the latter and unconstricted in the former. It is rather unfair for Mr. Wasmann to cite other genera, in which such and such characters become valueless, because it is well known to every biological worker that characters perfectly suitable as generic criteria in one group of species may lose all taxonomic value in another group, which may not even be far removed in the series.

It is not, however, primarily the defence of the genera in question that moves me to make this reply, but rather a singular feature, allied to disingenuousness on the part of Mr. Wasmann, which appears from some recent personal correspondence, and which reappears in the third paragraph of his article. To properly show this forth, it is necessary to reproduce the three postal cards which I have received from Mr. Wasmann during the current year. The entire text only of each card is given, the salutation and endings being omitted. The first is as follows:

"LUXEMBURG, March 5th, 1901.

"I acknowledge the receipt of your kind letter from February 20th; also your paper on *Corylophidæ*, etc., has arrived, but I could not find time to inform you of its arrival till now. Your publications will be always welcome to me; also specimens of myrmecophilous or termitophilous species, especially of those which you describe."

Nothing occurred after this acknowledgment of the receipt of my paper containing the table of the *Homœusa* group until the arrival of the following postal and little box :

" LUXEMBURG, May 1st, 1901.

" Will you have the kindness to name the species of *Myrmobiota* for me, which I send you by the same post in a little box? It was sent to me by one of my correspondents, who found it with *Lasius niger*."

It seems quite evident that the crafty wording of this missive was intended to ensnare if not to delude me, and as I had taken particular care in the paper mentioned to show why *Myrmobiota* could not be the same as *Homœusa*, the tacit assumption here implied that I did not know one genus from the other caused me to answer Mr. Wasmann rather sharply, and I informed him in positive terms that the specimen sent was in no manner a *Myrmobiota*, but a true *Homœusa*, and alluded to my recently-published paper, which I stated he could not have examined. Thereupon, I received the following postal :

" LUXEMBURG, June 1st, 1901.

" Having not your '*last paper*,' in which you explained the differences between *Homœusa* and *Myrmobiota*, I ask you to send it to me. Your letter has come to my hands, and I learned the existence of that paper only by your note in the letter. My specimens of '*Myrmobiota crassicornis*' were from Wickham too ; I am curious to know how you explain the generic difference between *Myrmobiota* and *Homœusa* now."

My astonishment on receiving this postal can well be imagined, but I nevertheless sent him another copy of the paper, and heard nothing more until the article in question appeared in this journal.

The fact that Mr. Wasmann still adheres positively to his original theory that *Myrmobiota* is congeneric with *Homœusa*, without having even a specimen, seems to savour of that form of narrow-mindedness which occasionally comes to light, even in men of acknowledged ability and reputation—a hesitancy to correct or withdraw a statement once made, although demonstrated to be untenable. I have always admired the work of Mr. Wasmann, and regret the necessity of going into print in dispute with him, but it will probably be admitted that there is at least some justification for it in this instance.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

(Continued from page 200.)

Since writing my first paper on the *Coccidæ* of British North America, a very large amount of new and interesting scale insects have been sent to me for study by Dr. Fletcher and Mr. John Dearness. In nearly every instance the twigs sent showed beyond question that the insects occurred upon the food-plants infested in injurious numbers; especially so of those found on blackberry, hazel-nut, spiræa, viburnum and oak. The following are new to the Canadian list:

Pulvinaria tiliæ, King and Ckll., 1898. (Native.) Mr. John Dearness sent these from Thedford, Ont, on *Cephalanthus occidentalis*. It was first recorded from Mass., found on *Tilia Americana*, *Quercus* and *Ulmus*, and described as a sub-sp. of *P. innumerabilis*, but further study proves it to be quite different from that species, and it should stand as *P. tiliæ*.

Eulecanium capreæ, L., 1758. (Introduced.) Found on a peach tree growing in a conservatory at Dartmouth, Nova Scotia, June 20, 1901, by Dr. A. H. Mackay, of Halifax, N. S. Dr. L. Reh, of Hamburg, Germany, has sent me this species infesting the following food-plants: *Pyrus malus*, *P. communis*, *Alnus* sp., *Cratægus coccinea*, *Prunus domestica*, *Tilia* sp., and *Aesculus hippocastaneum*. The species was originally described as *Coccus capreæ*, and has been recorded as *Coccus cyprœola*, Dalm.; *Coccus gibber*, Dalm., and *Lecanium salicis*, Bouché. Linnè described his from *Salix* sp.; it has since been found on *Salix alba* and rose in England.

Eulecanium corylifex*, Fitch, 1856. (Native.) Sent by Dr. Fletcher, infesting in a serious manner *Corylus rostrata* and *Viburnum pubescens*, growing intermingled at Aylmer, Prov. Quebec, 1901. Originally described from N. Y.

Eulecanium quercifex, Fitch, 1856. (Native.) Found on oak at Knowlton, Prov. Quebec, by Miss A. Wood. The species is a common one in the U. S., and was described from N. Y.

Eulecanium vini, Bouché, 1851. (Perhaps introduced.) Last spring I received a scale from Dr. Reh, of Hamburg, Germany, infesting *Vitis vinifera*, *Pyrus communis*, *P. malus*, *Prunus armenica*, *P.*

*The species of *Eulecanium* have hitherto been placed in *Lecanium*; it is here proposed to regard the genus as a valid one.

(Armygdalus) persica and *Robinia pseudacacia*, and on *Spiræa* and *Lonicera* sp. at Smolond, Sweden; coll. Mr. Sven Lampa. In 1851, Bouché described a scale from grapevines; his description, given to me by Prof. Cockerell, is as follows: "♀ kahforming in alten aber halbkuglig werden denkelbraum. Die Eier ohne wallige Euhiillung Lang 3 Innen an Winstocke." The scale received from Dr. Fletcher on *Spiræa salicifolia*. I cannot separate it from those received from Germany. Bouché's specimens, however, seem to have been a little larger than those before me; but the slight difference in their size counts for little in this case. There is no doubt that this is the so-called "vine-scale" of Germany. Are these scales introduced, or are they indigenous to both Europe and North America?

Chionaspis corni, Cooley, 1899. (Native.) Found on dogwood *(Cornus stolonifera)*, April 5, 1899, in a shallow, shrubby swamp at London, Ont.; coll. Dearness. This was described from Mass. in 1899, found at Reading on *Cornus paniculata* and *C. alternifolia*.

NOTES ON PREVIOUSLY RECORDED SPECIES.

The following notes are of interest, giving as they do several new food-plants and geographical range:

Eriopeltis festucæ, Fonsc. Sent by Dr. Fletcher; found in the woods on *Carex pedunculata* at Ottawa. This is a new locality and food-plant.

Pulvinaria occidentalis, Ckll. This was found by Dr. Mackay, June 14, 1901, on gooseberry bushes at Dartmouth, Nova Scotia. The plants were kept covered with glass jars until the young leaves began to appear. It was under these conditions when the scales were observed. A new locality.

Eulecanium quercitronis, Fitch. Mr. John Dearness sent these on twigs of *Ulmus* sp., May 28, 1891, from London, Ont. This is a new food-plant and new locality for the species in Canada, but is a common food-plant for the species in the U. S.

(To be continued.)

CORRESPONDENCE.

CONCERNING LARVAL DESCRIPTIONS.

The July CAN. ENT. (Vol. XXXIII., p. 186) contains a full and valuable account of the larva of *Alsophila pometaria*, by W. E. Hinds. The numbering of the setæ in the figure on page 186 is unfortunately stated to

be "according to Dyar's classification." This is misleading. The essential part of that classification depends upon the homologies of the tubercles, which I indicated by certain arbitrary numbers. Of course, Mr. Hinds is at liberty to call tubercle ii.a of the thorax iv., or vii. of the abdomen vi. + vii., etc., as in his figure, or make any other numbering, but he will please not label the result "according to Dyar's classification," which it is not. No one could homologize the description on page 187 with my writings without changing the numbers. Uniformity seems desirable. HARRISON G. DYAR, Washington, D. C.

NOT SURPRISED.

In reference to Mr. J. Alston Moffat's interesting account of the emergence of a *Telea polyphemus* cocoon, in the October number, and his query, "Is it double-brooded somewhere?" I would say that it is quite possible in localities and seasons. This year I caught a dark-coloured ♀ specimen early in May, and near the end of August I found emerging from a beautifully white and fresh-looking cocoon a light-coloured ♀. In 1898, I caught a large number of specimens at light throughout the months of May and June, and early in September found five specimens, two perfect, the other newly emerged, all resting on apple trees and distinctly paler in colour than those of the early part of the season. It struck me as remarkable, as I had seen no specimens flying during August or September, and concluded they were belated in their emergence. But on consideration it looks as if they were second broods, so hastened or prematurely emerged from their pupa state that they had not the strength and vitality of those that emerged in the proper season. Although kept alive for some time before killing, their wings crinkled up after being set, and made such unsatisfactory specimens for a collection that I threw them out. I now think that in some seasons there is a small second brood here, but so immature or weak that they do not fly.

CHARLES STEVENSON, Montreal.

THE NORTHWEST (CANADA) ENTOMOLOGICAL SOCIETY.

The third annual meeting of this Society has been convened for Saturday, November 9th, 1901, at 3 p. m., at Lacombe, Alberta, N.-W. T.

(1) To review the past work of the Society.
(2) To devise extension of the work.
(3) To elect officers for 1902.

This meeting will, we understand, be of unusual interest, as prizes have been offered, two by Dr. James Fletcher, of Ottawa, and one by the Society, for competition by the young folk of Lacombe district for the best collections of insects of all orders, and the best of noxious and beneficial insects. As there are a considerable number of Agricultural Societies and farmers who are members of the N.-W. Entomological Society, this competition is a step in the right direction.

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The Canadian Entomologist

VOLUME XXXIII.

No. 12.

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EDITED BY

REV. C. J. S. BETHUNE,

LONDON, ONTARIO.

DECEMBER, 1901.

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1901.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

WANTED.—Nos. 3 and 6 of Vol. S. of the Entomological News. FRANK E. WATSON, 974 E. 168th St., New York, N. Y., U. S. A.

LEPIDOPTERA.—Fine bred specimens of *Catocala illecta* and *minuta* for exchange. Also *Nathalis iole*, *Anœa andria*, etc. Want Catocalæ, butterflies and sphinges. G. M. DODGE, Louisiana, Mo.

WANTED —American silk-producing Lepidoptera. Directions for the rearing of wild silkworms can be obtained from the author. For terms, address ALFRED WAILLY, Branksome, Upper King's Road, Kingston Hill, London, Eng.

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ORTHOPTERA.—Wanted, specimens and literature for exchange. FRANK E. LUTZ, Zoological Bldg., University of Chicago, Chicago, Ill.

A NEARLY complete set of U. S. Agricultural Reports for exchange for some works on Entomology not in my library. Please make offer. GEORGE B. KING, Lawrence, Mass.

LEPIDOPTERA.—Would like to receive duplicate lists of collectors in every State. Rhopalocera especially desired. JOHN & HURD COMSTOCK, 1572 Ridge Ave., Evanston, Illinois.

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BRITISH GUIANA.—The advertiser is now collecting insects in Guiana. Would like to hear from anyone requiring good specimens from there. R. J. CREW, Georgetown P. O., Demerara, S. A.

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LEPIDOPTERA: Sphingidæ, Arctiidæ and Saturniidæ of the world desired in exchange. Liberal exchange given. HENRY ENGEL, Box 369, Pittsburg, Pa., U. S. A.

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DIPTERA wanted from Washington and British Columbia in exchange for North American Coleoptera. W. S. HUNTINGTON, 1910 N. Twenty-first St., Philadelpha.

PAPILIOS brevicauda, nitra, Oregonia, indra, female, nezahualcoyott wanted; also Cicindelidæ, Cychrus, Carabus and Calosoma. Will give liberally in exchange. GEO. A. EHRMAN, 2314 Sarah Street, Pittsburg, Penna.

LEPIDOPTERA.—I have a large number of both mounted and papered specimens for exchange. All are 1900 captures. Correspondence in both English and German. Address: A. KWIAT, 701 Larrabee St., Chicago, Illinois, U.S.A.

LEPIDOPTERA, in papers, of Canada and U. S. A., wanted in good exchange for fine Lepidoptera of Europe, Asia, South America. I take only first-class quality. Please to write Smith's number upon the paper. WILHELM NEUBURGER, Lepidopterist, Berlin, S. 42, Luisen-Ufer 45, Germany.

COLEOPTERA.—Will exchange Canadian Coleoptera, in papers, for Coleoptera of U. S. and Canada. Please send lists. C. J. OUELLET, Deaf and Dumb Inst., Ville St. Louis, Montreal, P. Q.

The Canadian Entomologist.

VOL. XXXIII. LONDON, DECEMBER, 1901. No. 12

A NEW GORTYNA, AND NOTES ON THE GENUS.

BY HENRY H. LYMAN, M. A., MONTREAL.

I use the name *Gortyna* in preference to *Hydrœcia* as, without pretending to be an authority upon the question, it appears to me that there is better authority for the former, as used by Mr. Grote, than for the latter. My acquaintance with the moths of this genus, which I have always admired, dates back about thirty years, but in spite of that length of time my knowledge of them up till last year was of the most meagre description, and apart from the species which has stood so long in our collections under the name *Nictitans*, and a few specimens of *Velata*, Walk., I only possessed about half a dozen specimens, mostly in poor condition, representing *Immanis*, *Stramentosa*, *Rigida*, *Nebris*, *Rutila*,* and a form which Mr. Bird believes to be new.

It may be of some interest to point out that the specimen of *Rigida* referred to was taken by me probably between 1873 and 1875, and was lent, among other specimens, for the Society's exhibit at the Centennial Exhibition at Philadelphia, in 1876, and was returned to me under the name *Purpurifascia*, *Rigida* not having been described till the following year. For some reason which I cannot understand, the two forms *Nitela* and *Nebris* have, since the issue of Grote's Check List of 1882, stood in our catalogues under the specific name *Nitela* and the varietal name *Nebris*. If the *Nitela* form were the prevailing one, with the form *Nebris* much less frequent, the position thus given them would be quite natural, but if, as I understand is the case, the two forms occur in practically equal numbers, the name *Nebris* should take precedence as

*There is some uncertainty as to whether this form is the true *Rutila*.

the name of the species, with *Nitela* as the varietal name, on the ground of priority, as Guenée described *Nebris* first and then *Nitela*, saying: "Taille et couleur de la *Nebris*, dont elle ne diffère que par l'absence complète des taches blanches, et les palpes un peu plus longs et plus ascendants."†

An additional reason for this position, if any were needed, is that *Nebris* has the typical markings of the genus, while *Nitela* departs from the type.

Another matter to which I am obliged to take exception is the giving of the name *Atlantica* by Prof. J. B. Smith to the form which had been supposed to be identical with the *Nictitans* of Europe. Speyer had recognized at least a varietal difference in 1875, and named the American form var. *Americana*, and if its specific distinctness be recognized, Speyer's name must be used, as there is no warrant under the law of priority for setting it aside.

Last year I was informed by Mr. Winn and Mr. Brainerd, between the middle and end of July, that the larvæ of *Rutila* could be obtained commonly, boring in the burdock. I was not able to look for them at once, but went out early in August, and succeeded in finding about half a dozen bored stems, which I took home. Later, on cutting them open to see if I had anything, I found the burrows in all but one tenanted only by wood-lice and slugs, but in the last one opened I found a pupa. This I kept in the stem, under a glass shade, and about September 1st the imago emerged and proved to be new to our members, but Dr. Dyar to whom I subsequently showed it, thought it only a varietal form of *Necopina*.

Shortly afterwards I went to Europe, but did not take the specimen with me, as my trip was a hurried one, and I was afraid it might meet with some accident, but when visiting the British Museum I looked up the specimens in this genus, but could not find anything to agree with it. I naturally became much interested in the group, and through the kindness of friends, especially Mr. Henry Bird, by a few purchases and by my work during the past season, have succeeded in getting together a fair representation of most of the North American forms.

This year I again searched in the same locality, a little earlier in the season, and secured five or six of the larvæ, and succeeded in rearing five

†Spec. Gen. Noct. I., 124.

more of the moths, and as the form differs from *Necopina*, the only species with which, in my opinion, it could possibly be confused, not only in the imago, but also in the larval and pupal stages, I have no hesitation in describing it as a new species.

Gortyna Ærata, n. sp.

Very similar in general appearance to *G. Necopina*. The colour of the primaries more bronzy, especially in the median space, and with a distinct purplish or sometimes dull mauve shade beyond the t. p. line.

Head and thorax similar in colour to the primaries, powdered with white atoms, as in *Necopina;* abdomen lighter, similar in shade to the secondaries, and more evenly gray. In *Necopina* the dorsal tuft is somewhat conical, and projects forward, while in *Ærata* it is more transverse and slopes backward. Antennæ brown or grayish, slightly marked with whitish, springing from a whitish collar.

The wings, especially the primaries, are also somewhat powdered with white, but much less so, and, in general, less evenly so, than in *Necopina*. Of the types, the one which comes nearest to *Necopina* is No. 5, and in this the powdering is almost as even as in that species. The markings, as a rule, are obscure, especially in the flown specimens, but the t. p. line is generally fairly well marked, and the t. a. line can occasionally be made out either in whole or in part.

In five out of the six bred specimens there are a few yellowish spots or dots running in from the costa a little before the apex, and in four out of the six there are on costa of primaries four yellowish dots, the first being just above the reniform and the others between it and the pre-apical series, at about equal distances apart. The t. p. line, when strongly marked, as in type No. 6, a most remarkable specimen, is seen to be double, and sometimes, as in type No. 2, the space within the lines is more or less filled with yellowish scales.

The orbicular and reniform are generally obsolete, or, at most, indicated by dark shades only, but in type 6 both are present, the former only represented by a yellowish dot, but the latter well developed and consisting of a central curved brownish-yellow line surrounded by five or six yellowish or whitish spots of varying size and shape.

In several of the specimens there is a purplish or dull mauve shading within the t. a. line, or between it and where the basal line should be The s. t. line, when shown, is strongly dentate, but is generally indicated merely by the difference in shade between the dull mauve within and the

bronzy shade beyond it, though its course is sometimes indicated by a few yellowish scales. The secondaries are paler than in *Necopina*, the veins dark, and generally with a discal mark and a submarginal dark shade. Both wings show a double terminal dark line, but naturally this is more evident on the lighter secondaries.

Fringes of primaries dark, slightly mottled with mauve gray, of secondaries lighter. Beneath, primaries dark brownish gray, lighter towards inner margin, secondaries dark on costal margin and especially at apex, the rest lighter, with a dark discal spot and median line. Both wings more or less powdered as above. Feet brown, fore tarsi marked with whitish.

Expanse 32 to 43 mm.

Described from nine specimens, 4 ♂ and 5 ♀, six bred by me between August 24th and September 6th and now in my collection, and three, Nos. 7–9, captured by Mr. Winn on September 10th and 14th, which are in his collection.

The food-plant of the larva, as already mentioned, is burdock (*Arctium Lappa*, L.), and the larvæ when found were apparently in the penultimate stage. I intended to make a detailed description, but being exceedingly busy, delayed too long, and when I removed them from their burrows for this purpose I found that they were mature, and, as is usual in this genus, the markings had become too obscure for any description to be of value.

I noticed, however, when I found them that the dorsal and subdorsal lines were continuous, thus differing from *Rutila*, in which only the dorsal line crosses the dark space on the first four abdominal segments, and *Necopina*, in which not even the dorsal line crosses this space.

Pupation sometimes took place in the burrows and sometimes not.

The difference in the pupæ of the two species is also marked, as in *Necopina* there is a frontal tooth-like development, which, as Mr. Bird suggests, appears to be an indication of what occurs in *Ochria*, where a distinct clypeal spur exists, but this is absent in *Ærata*, as I was able to verify through his kindness in sending me some pupæ of *Necopina* for comparison.

It is perhaps hardly necessary to add that the specific name which I have given is from *æratus*—overlaid or covered with bronze—from the prevailing bronzy appearance of the primaries.

NEW DIURNAL LEPIDOPTERA FROM SOUTH AMERICA.

BY A. G. WEEKS, JR., BOSTON, MASS.

(Continued from page 296.)

Pythonides hirta, sp. nov.

Habitat: Bogata district, Colombia. Expanse: 1.50 inches.

Head, palpi, thorax and abdomen above, dark mouse colour; beneath, nearly white. Between the eyes are three white dots. Antennæ black. Legs grayish white.

Upper side of fore wing dark mouse colour. There is a broad prominent yellowish-white band extending from costa down to submedian nervure, its inner edge straight, the outer edge swelling outwards somewhat. The interspaces between this distinctive band and the hind margin, also the interspaces upwards towards costa, are heavily dusted with light mouse-coloured scales. The nervures and nervules are nearly black. The hind margin bears a slight hairy fringe and a very slight darkish thread.

Upper side of lower wing dark mouse colour. There is a broad white area covering central half of costa and extending downwards to the median nervure, suffusing somewhat towards hind margin. Outside of this area the interspaces show a little lighter shade than the ground colour. The nervures and nervules are dark. The hind margin has a slight hairy fringe and a very slight darkish thread.

The yellowish-white band of fore wing and the white band or area of lower wings form the prominent marking of upper surface. The rest of the wing is of dark colour, with the slight variations above noted.

The under side of fore wing is divided between white and dead mouse colour. The basal portion within a line drawn from centre of costa down to lower angle is white. The rest of the wing (the apical area) is dead dark mouse colour, the interspaces showing white dashes starting at subcostal interspaces midway between the apex and the edge of the white area. The hind margin has a hairy fringe and a darkish thread.

The lower side of hind wing is white, excepting a broad hind marginal border of dark mouse colour, which suffuses upwards towards base as it reaches the anal angle. At the upper angle there is a sugges-

tion of a white line running through this border just within the margin, but it is very indistinct. The hind margin has a slight hairy fringe of mouse colour and a darkish thread. In some lights the basal area of both wings shows a bluish-gray tinge. The prominent bands of the upper side also show slightly, owing simply to transparency.

Type.—One specimen taken in 1896. A duplicate of this species was found in the Godman collection unnamed, and undoubtedly it has never been described.

Thecla Francis, sp. nov.

Habitat; Bolivia, near Alezuni. Expanse: .88 inch.

Head, thorax and abdomen above, black, with grayish hairs; below, grayish white, with yellowish tinge towards end of abdomen. Antennæ above, nearly black, with white annulations at base of each joint; below, lighter, nearly white towards club. Club somewhat tawny. Legs grayish white.

Upper side of fore wing dead grayish-brown. The area bordered by a line drawn from base up median nervure, thence to a point midway between end of discoidal space and hind margin on first discoidal nervule, and thence straight down to inner margin, shows a decided purplish lustre, evident in almost all lights. The angle at apex and also at lower angle is quite sharp.

Upper side of lower wing the same, except that the lustrous area covers entire wing, barring the costal region and inner marginal edge. The lustrous area is also less purplish than on fore wings, having a more bluish tinge. The hind margin is bordered by a dark thread. At end of submedian nervure there is a short, stumpy tail, not threadlike, but rather a jutting out of the wing area. The nervures and nervules are distinctly darker than ground colour.

Under side of fore wing dead grayish-brown, of a lighter shade than upper surface. One-third distance from apex to base there is a very slight suggestion of a line of interspacial whitish lines, extending downwards parallel to hind margin. It is scarcely perceptible, however.

Under side of hind wing of the same ground colour as fore wing. The whitish line extends downwards to anal angle, being no more prominent than on fore wings, scarcely perceptible. Just above the lower submedian nervule, close to the margin, is a semicircle of light tawny, not

a all prominent, but quite perceptible on close inspection. The basal area of the wing is dusted with dark scales.

Type.—One specimen taken August 8th, 1899.

Nisoniades tihoneta, sp. nov.

Habitat: Bolivia, near La Paz. Expanse: 1.75 inches.

Male.—Head, palpi, thorax and abdomen above, black, with brownish hairs; beneath, black, with red-brown hairs. Antennæ above, black; beneath, lighter, turning to yellowish white at club. The abdomen has a red-brown end.

Fore wing above blackish-brown, with a few lighter hairs in basal area. Near end of discoidal space is a jagged white spot. Midway between this and apex are three subcostal interspacial white dots. On a line drawn from apex down to centre of inner margin is a series of white spots, five in number. The first is scarcely visible, and under it, in next interspace, is a larger spot; below this and nearer the base is another of about the same size; below this and nearer the base is another much larger one; below this and nearer the base, resting on submedian nervure, is another directly under the white discoidal spot. Running from end of discoidal space, starting just inside of the largest white spot, is a distinct white line, ending at submedian nervure and having a background of blackish brown, darker than ground colour. The hind margin has a narrow fringe of hairs of ground colour, but tawny as it approaches lower angle. The white spots are transparent rather than absolutely white.

Hind wing above blackish brown, with tawnyish hairs covering basal area. On a line drawn from upper angle across to the centre of inner margin are four interspacial elongated transparent white spots, the first under the first subcostal nervule, and the rest following in the consecutive interspaces. The fringe of hind margin is tawny, narrow at upper angle, but broadening towards anal angle, and becoming quite prominent.

Under side of fore wing duplicates the white spots of upper surface, the lowest spot showing more whitish. The apical area extending half way toward the base is brown, tending to dark brick red. The interspaces just within hind margin are heavily dusted with grayish scales from apex half way down to lower angle, forming quite a prominent feature. The basal area is blackish. Fringe of hind margin is the same as on upper surface. The white line of upper surface running from end of discoidal space downwards does not appear on under side.

The ground colour of under side of hind wing is brown, tending to dark brick red. From the centre of costa, extending transversely across to submedian nervure, is a band or area heavily dashed with grayish or whitish scales bending towards base at its central portion. The transparent white spots of upper side are repeated. The two interspaces towards inner margin are dusted with whitish scales, giving an appearance of a continuation of the spots. The hind margin has a fringe of tawny hairs, becoming quite prominent towards anal angle. Within the margin for upper half of wing, the interspaces are heavily dusted with grayish or whitish scales. The inner margin is reddish brown, the two interspaces above being blackish.

Female.—Identical with male, excepting the absence of the white line and its dark ground on fore wings.

Described from specimens taken April 5th, 1899. It is very closely allied to *N. macareus*, Herr Schaff.

A CHANGE OF NAME.

I have been promptly informed by Prof. Cockerell that the name *Phyllostoma*, used by me in the November number, page 290, for a new genus of Lucanidæ, is already in use for a genus of bats. I would therefore propose in its stead DIPHYLLOSTOMA. It has become a matter of no small difficulty to select for a new genus a significant name, which has never been used in any department of zoology, and for this reason there is some excuse for the custom in vogue among certain authors of using for generic titles purely meaningless, but euphonius, combinations of letters, or various permutations of the letters in the names of older allied genera. This method of coining generic names certainly possesses the merit of simplicity, since they can be evolved in any required quantity at a moment's notice and with practically no danger of preoccupation. Personally, the custom seems deplorable for several reasons, but I am not disposed to deny that it may be defended on other grounds than expediency.

H. C. FALL.

THE LIFE-HISTORY OF *ARCTIA VIRGUNCULA*, KIRBY.

BY ARTHUR GIBSON, DIVISION OF ENTOMOLOGY, CENTRAL EXPERIMENTAL FARM, OTTAWA.

On the 22nd June, 1901, I received from Mr. A. Kwiat, of Chicago, a batch of eggs of *Arctia virguncula*, Kirby. These eggs were laid on the 18th June and hatched on the 25th and 26th. The following notes on the early stages of the species were taken. A brief description of the mature larva was published by Mr. Coquillett, in the first number of Papilio, in 1881.

Egg.—0 8 mm. in diameter, semi-ovoid, about as high as wide, shiny, creamy white at first; before hatching, a shiny lead colour. Under a lens the egg has a reticulated appearance and is slightly concave at base.

Stage I.—Length, 2 mm. Head 0.4 to 0.45 mm. wide, rounded, rather deeply depressed at apex, upper inside portion of cheeks black, shiny; clypeus and lower part of face brownish, ocelli black, mouth-parts blackish; hairs on face, some long and some short, pale and black. On each segment of body is a transverse row of shiny black tubercles. Tubercle i very small, ii and iii large, iv and v smaller than ii and iii; ii, iii, iv and v are surrounded with a wide blotch of reddish-brown. The colour of the skin at first is a dirty cream; after feeding, the larvæ are pale greenish. The reddish blotches surrounding the tubercles give the larvæ a reddish appearance, and the skin in the centre of dorsum against the reddish blotches appears as a dorsal stripe. The hairs from the tubercles are long and slender, those on dorsum being black, while those from lateral and lower tubercles are pale. Thoracic shield black, bearing small black tubercles. Thoracic feet and prolegs semi-translucent, slightly darker exteriorly than ventral surface.

On the 28th June all the larvæ were swollen, and by the morning of the 29th had passed the first moult

Stage II.—Length, 4.2 mm. Head, 0.55 to 0.6 mm. wide, shiny, shaped as before; upper portion of cheeks blackish, lower portion and clypeus brown, mouth-parts reddish brown, hairs on face long and slender, mostly black on upper portion, pale on lower; some heads have more

black than others. Just after moulting, in general appearance the larvæ are black, but after a day the skin is of a shiny, semi-translucent greenish tint, and the tubercles are each in a field of pale reddish-brown, which, as in Stage I, gives the larvæ a reddish appearance. The dorsal stripe is distinct, of a pale bluish-green colour. The tubercles are large (i very small), shiny black, the dorsal series bearing a bunch of short, barbed, black bristles. Tubercle ii has a shining base. The bristles from lateral and lower tubercles are pale, rather reddish. Spiracles black and very small. Thoracic shield not so conspicuous as in Stage I. Thoracic feet and prolegs concolorous, darkened at tips.

On the 2nd July some of the larvæ passed the second moult, others on the 3rd and 4th.

Stage III.—Length 6.5 mm. Head, 0.8 to 0.9 mm. wide; almost whole upper surface of cheeks dark shiny brown, clypeus and lower portion of cheeks pale—of a yellowish-brown tinge, — mouth-parts blackish, or dull reddish; hairs on face long and short, the long ones mostly black, short ones pale; ocelli black, antennæ brownish, the basal half pale. In general appearance the larvæ in this stage are dark brown. On examination with a lens, the skin is seen to be greenish, covered with brown blotches. The dorsal stripe is pale blue and distinct. The tubercles are shiny black, i very small, ii very large, with a polished base, iii slightly smaller than ii, and iv slightly smaller than iii. Bristles from tubercles distinctly barbed. The colour of the skin between tubercles ii and iii, and iii and iv is yellowish, with a slight reddish tinge. The bristles from dorsal and lateral tubercles are mostly black. but these tubercles also bear a few pale bristles. The bristles from ventral surface are pale and shorter. The dorsal tubercles on segments 12 and 13 bear a few very long bristles. The spiracles are very small, black and close in front of tubercle iv. The thoracic feet and prolegs are concolorous with venter, but are darkened in front.

During the morning of the 6th July a few specimens passed the third moult; others moulted on the 7th, 8th and 9th.

Stage IV.—Length, 10 mm. Head, 1.2 to 1.3 mm. wide, depressed at apex, lobes almost wholly black, space on sides of cheek, just above ocelli, pale brownish; lower front of face brown, with the exception of central portion of clypeus, which is blackish; antennæ brown, pale at base; ocelli black, mouth-parts as before. The larvæ in general

appearance are now deep black, with reddish bristles from lower lateral and ventral tubercles. The dorsal stripe is pale bluish, indistinct in most specimens. The tubercles are large (i small), shiny black, bristles barbed; all tubercles about same proportion as before, ii has a shining base. The bristles from i and ii are mostly pure black, but there are a few pale rust-red bristles intermingled. Those from tubercles iii and iv are mostly pale rust-red, but there are also a few black bristles mixed with these. The bristles from the tubercles below the spiracles are pale rust-red. Spiracles small, black. The dorsal tubercles on the two posterior segments bear a few very long bristles as before. Thoracic feet shiny jet black; prolegs, upper half concolorous with venter, lower half pale, all bearing sparse short hairs. As the larvæ increase in size during this stage, the skin loses its deep black colour, becoming more of a blackish-brown, with the venter rather paler than the dorsum.

On the 12th July about ten specimens passed the fourth moult; others on the 13th and 14th.

Stage V.—Length, 16 mm. Head, 1.5 to 1.6 mm. wide, indented at vertex as before, whole front of face shiny black, with exception of margin of clypeus at sides, which is brown; space on sides of cheek, just above ocelli, pale brownish as before, but now spotted with darker brown; ocelli black, antennæ as before, mouth-parts blackish. Skin of body wholly velvety black. The dorsal stripe has disappeared and is not present in any of the specimens (50). In most of the larvæ the bristles from tubercles i and ii are all black, but in a few specimens many of these bristles are dark reddish. Tubercle iii bears mostly black bristles, with some reddish ones intermingled. From tubercle iv all the bristles but one or two are bright rust-red. Bristles from tubercles v and vi are all bright rust-red, as well as those from ventral tubercles. Spiracles small and black as before, almost touching anterior edge of tubercle iv. Thoracic feet and prolegs as in last stage, setæ on all feet short and concolorous with bristles from ventral and lower tubercles.

On the 16th July one larva passed the fifth moult, and on the 17th and 18th many others moulted.

Stage VI.—Length, 25 mm. Head, 2.0 to 2.2 mm. wide, same as last stage, only the pale space above ocelli has larger spots. Body as in Stage V, with no markings. The reddish bristles from tubercle iv and those from tubercles below spiracles are very bright. The bristles from

tubercles i and ii in most specimens are all black, but some have one or two reddish bristles also. Tubercle iii has mostly black bristles, but also a few reddish ones. Tubercles all black as before, bristles barbed. Spiracles black. Thoracic feet black, setæ mostly pale; prolegs pale reddish, setæ concolorous with bristles from subventral tubercles.

On the 20th July one larva passed the sixth moult, another on the 21st, and others on the following days.

Stage VII.—Length, 31 mm. Head, 2.5 to 3.0 mm. wide, slightly smaller than segment 2, rounded, somewhat quadrate, depressed slightly at vertex, black, shiny, flattened in front; ocelli black, hairs on face all black, with exception of a few pale ones around mouth-parts; antennæ pale at base, dark in centre, and brownish at tip. In some specimens the median suture is pale, also the lower half of the epistoma. Skin of body in many specimens wholly velvety black; in others, same colour, but shading to grayish-black subventrally. Tubercles all black; bristles distinctly barbed. Tubercle i small, about one-third the size of ii; ii with a shining base, larger than iii; iii, iv and v about same size; vi smaller than v. Bristles from i, ii, iii and upper half of iv black, from lower half of iv and other tubercles bright rust-red. In some specimens nearly all the bristles from iv are rust-red. Spiracles black, inconspicuous, almost touching anterior edge of tubercle iv. On segments 12 and 13 there are a few long black hairs. Thoracic feet shiny black, tipped with reddish brown; setæ mostly pale; prolegs, upper portion shiny black, lower portion and claspers reddish; setæ rust-red.

The mature larva at rest is 35 mm. long, and when extended, 40 mm.

On the 28th July two specimens began to spin their cocoons; another on the 1st August, and others soon afterwards.

The cocoon is thin, consisting simply of a slight web of reddish-brown silk covering the pupa, and is enclosed in a leaf or two of the food-plant, which have been drawn together and fastened by threads of silk. Some of the specimens spun up amongst some blades of dry grass which were in the breeding cage.

Pupa.—Length, 22 mm.; width at widest part, 7.5 mm.; black, folds of abdomen faintly dull reddish; pruinose; abdomen bears sparse short, thick hairs, and is minutely pitted; thorax and wing-cases wrinkled. Spiracles dull black, faintly tinged with dark red in centre. Cremaster round, shiny black, terminating in a bunch of about 22–25 capitate dull-reddish bristles.

The first moth emerged on the 11th August, the next on the 17th August, and others on the 19th and 20th August. The average length of the pupal stage was 14 days. In the spring of 1901, the late Mr. T. G. Priddey, of Toronto, sent to the Division a few larvæ of *A. virguncula*. One of these began to spin a cocoon on the 1st May, the moth emerging on the 28th May. Another specimen which began to spin on the 5th May had changed to pupa by the 8th May, and the moth emerged on the 1st June. In these two instances it will be seen that the length of the pupal stage was much longer than that of those mentioned above. Some of the larvæ of the above brood stopped feeding about the middle of August, and acted as if they wanted to hibernate. In September they were put in a cool cellar, but by the middle of October they had all died. These were all mature larvæ, and I cannot account for their not spinning up with the others. At Toronto the writer has taken the moths commonly at light about the middle of June.

Food-plant.—The larvæ described in the present paper, as well as those received in the spring, were fed on plantain and dandelion.

A NEW GENUS OF MYRMELEONIDÆ.

BY NATHAN BANKS, EAST END, VA.

Hagen, in his "Stray Notes on Myrmeleonidæ," published in the CANADIAN ENTOMOLGIST for 1887 (Vol. XIX., p. 210), called attention to the fact that there are several species of ant-lion-flies in this country which lack tibial spurs. He placed these species in *Maracanda*, McLach., a genus based on one species from Turkestan. McLachlan's description of the genus agrees moderately well with our forms, except in a few minor particulars. But on examining the figure of the Turkestan insect it is at once apparent that our forms are not congeneric with it. The figure [Fedtschenko's Reise in Turkestan, Neuroptera, Plate 1, fig. 1] shows that in *Maracanda* there are five or six crossveins before the origin of the radial sector, and that the first branch of the radial sector arises far beyond the end of anal vein. These characters place the genus in a different section from the species we have included in *Maracanda*.

Moreover, the figure shows that the prothorax is quite broad, and the femora are stated to be lineate with black in the description. The last joint of the labial palpus is said to be much dilated. All these characters are foreign to the species we have wrongly included in *Maracanda;* therefore it becomes necessary to propose a new genus for our species.

Cryptoleon, new genus.

Antennæ about as long as head and prothorax; pronotum rather narrow; legs rather short and not slender, no spurs, anterior tarsus about as long as the tibia; last joint of labial palpi but little swollen. Two or four crossveins before origin of radial sector; first branch of radial sector arises much before the end of anal vein; costals in a single or double series; in the hind wings the cubital fork runs parallel to the anal vein for some distance.

Type, *Myrmeleon conspersus* Rambr.

CURIOUS EFFECT OF THE ATTACK OF AN ASILUS FLY ON COLIAS PHILODICE.

BY ALBERT F. WINN, WESTMOUNT, P. Q.

During the last week of my holidays at Biddeford, Maine, this summer, *Colias philodice* was abundant and in fine condition, and a great many were taken, in the hope that among them there might be some *C. interior*, but none of this species were found.

On July 19th, however, I noticed on the wing a yellow butterfly whose flight was most peculiar, and on capturing it, it proved to be a ♀ *philodice* in the clutches of a robber-fly (Asilus ——— sp.). Both were immediately put in the cyanide bottle, and about an hour later were folded up in the same paper, and the butterfly was not noticed as being in any way different from the usual well-known colour, but on the evening of July 24th, while looking over my captures with Mr. Chagnon, I came across these two specimens, and, to my surprise, the under side of the *philodice* was, by electric light, of a pale greenish colour. I was still further astonished to find that it was quite soft, although it had been in paper for six days, and all my other specimens were dry. I spread it, without relaxing, and it was duly taken off the boards to show to Mr. Lyman, who, I knew, would be interested in anything odd in the way of a Colias.

About a week later Mr. Lyman brought it back to me, remarking that "it was very curious that the colour of the under side should have become that greenish colour, by artificial light, and that *I had better spread it properly.* I thought I had done this already, but a slight breath closed its wings over its back and another flattened them out again. Three weeks more were given it on the setting-board, and it was still soft,

and now, 11 weeks after its capture, it remains, wings, antennæ and all, in as nice a condition for spreading as you could wish,—but it won't stay spread!

NOTE ON BÆUS.

BY W. HAGUE HARRINGTON, OTTAWA.

About ten years ago, in sifting swamp mosses for Coleoptera, I met with certain active little insects which, despite their wingless form and almost microscopic size, were recognized as members of the order Hymenoptera. Some of the individuals so captured were afterwards described by Ashmead, in his Monograph of North American Proctotrypidæ, as *Bæus minutus* and *B. piceus*. Subsequently, *B. americanus*, Howard, and *B. niger*, Ashmead, were also discovered at Ottawa. My solitary example of the former species was found sluggishly crawling on the under surface of a stone in the chilly temperature of early spring, and one example of *B. niger* was taken with a sweeping-net at the end of September. With these two exceptions, all my specimens of the genus were taken from moss collected at the beginning of winter. All were females, as might be expected, for it is the females only of bees and wasps, and probably of all hymenoptera hibernating in the imago condition, that survive the winter in these northern lands.

It was, therefore, with much pleasure that, in examining a tube in which a spider's cocoon had been placed, I found that a number of minute creatures had emerged, which required only a glance to show that they belonged to *Bæus*. The cocoon was a small spherical one, of mottled gray colour, about three millimeters in diameter, and was probably constructed by a member of the Theredíidæ. It was collected toward the end of June, but, unfortunately, the tube was laid aside unlabeled, and the time of emergence of the parasites is not known. Many of the spiders had also hatched, and had spun many delicate lines throughout the tube before perishing.

The parasites had apparently emerged later, as the majority of them had been entangled in the spiders' threads. They were twenty-four in number, and, to my delight, four were males, for individuals of which sex my searches had hitherto been in vain. Probably if they had not appeared with the females I should have had considerable difficulty in placing them.

The specimens are apparently referable to the *B. niger* of Ashmead, which is slightly larger than *B. minutus*, and more uniformly coloured. The females are a deep black, with the exception of the pale under surface of the antennal club, and of the tarsi, and, in some instances, of portions of the tibiæ, which are more or less piceous.

The males at first glance look larger, but this is due to the more developed thorax and to the presence of the wings. In the female the thorax is the smallest of the three sections of the body, and is almost lost sight of between the large head and abdomen. The head of the male is large, being slightly wider than the thorax, but the abdomen is minute and flattened, and the thorax robust and dorsally prominent. The antennæ and the legs, except the coxæ, are pale yellow, as in the solitary male of *B. americanus* mentioned by Ashmead. The scape of the antenna does not reach to the anterior ocellus, which is about on a line drawn across the face through the middle of the eyes; it is as long as four of the funicular joints. The pedicel is as long as the two following joints and stouter; the first joint of funicle is longer than second, but not so thick; the following seven joints are submoniliform; the penultimate is slightly longer than thick, and the final joint is small and conical. The two terminal joints are closely appressed, forming a small divided club.

The wings of these four males are much longer than in the individual figured by Ashmead (loc. cit., Plate VIII.), as they extend fully half their length beyond the tip of the abdomen. The marginal vein is situated about one-third of the length of the wing from the base and is as long as the stigmal nervure, while the basal nervure is well defined. Ashmead's figure shows the marginal vein beyond the centre of the wing, and indicates that the specimen figured was one not having fully-developed wings. Such differences in the development of the wings are not uncommon with the Proctotrypids. In the case of such insects as Bæus, of which the females are entirely wingless and have the thorax in part atrophied, it is interesting to find males with wings so well developed.

Mr. Percy B. Gregson, of Waghorn, Alberta, President of the Northwest (Canada) Entomological Society, is leaving at once for a visit to England, and does not expect to return till the beginning of March. He begs that his correspondents will abstain from writing to him during his absence, as he would be unable to reply to their communications.

THE COCCIDÆ OF BRITISH NORTH AMERICA.

BY GEO. B. KING, LAWRENCE, MASS.

(Continued from page 315.)

Eulecanium Fitchi, Sign. This seems to be a very serious pest. The specimens sent by Dr. Fletcher came from Mr. J. D. Evans, of Trenton, Ont., and the scales were infesting a plot of six acres of blackberry bushes, just as they were about ready for the market. Fortunately, however, of the first lot received, over one half of the scales were destroyed by a fungus, and of the second lot, about one third at least. Trenton is a new locality for this scale. In addition, the scale insects were infested to a remarkable extent by two species of Hyperaspis and two species of Chalcid parasites.

Eulecanium juglandis, Bouché. Very seriously infesting plum trees in Nova Scotia. Coll., Prof. Mackay. This is a new locality.

Eulecanium Canadense, Ckll. This has been found on maple and elm at Arnstein, Ont., which is a new locality.

Aspidiotus perniciosus, Comst. I received this on twigs of gray willow growing at London, Ont. Coll., J. Dearness.

Aspidiotus ancylus, Putn. This was sent by Mr. Dearness, on plum and shell-bark hickory from East Essex Co., Ont.

Aspidiotus hederæ, Vall. Received from Mr. Dearness, who found it on English ivy on a house-plant set out of doors, at London, Ont.

Chionaspis Lintneri, Comst. Found on leather-wood *(Dirca palustris)* growing near the shore of Lake Huron, in mixed woods, about 40 miles from London, Ont., May, 1899. Coll., Mr. Dearness. The food-plant and locality are new.

Chionaspis pinifoliæ, Fitch. On exotic pine at Leamington, Ont., and on Austrian and Scotch pine at London, Ont. Coll., Mr. Dearness.

Chionaspis furfurus, Fitch. Two lots of this scale were received on bark of mountain ash from Ridgetown, Ont., and one lot on twigs of apple from London, Ont. Coll., Mr. Dearness.

New Species.

Pulvinaria viburni, n. sp. (Native.) ♀.—Scale 4 mm. long, 3½ wide, to 5 long and 4 wide. Colour, red-brown. Ovisac, clear white. Texture, the same as in *P. innumerabilis*. Boiled in caustic potash the skin becomes colourless. Antennæ of 8 joints, measuring as follows in μ: Joint 1 (36), 2 (40), 3 (60), 4 (48), 5 (36), 6 (24), 7 (24), 8 (40). Formula 34(28)(15)(67). Leg: coxa 112; femur, with trochanters,

180; tibia 136; tarsus 80. Stigmatal spines in threes, one long and thin, two short and stout. Marginal spines numerous, simple, 24 μ long.

Hab.—On *Viburnum pubescens* in the woods at Aylmer, Prov. Quebec, about nine miles from Ottawa; on the same twigs were *Eulecanium corylifex*, Fitch. Coll.: Dr. Fletcher. This species is allied to *P. innumerabilis*, *P. tiliæ* and *P. marmorata*, and I thought at first it was the last species, but it seems to be distinct.

Eulecanium Guignardi, n. sp. (Native.) ♀.—Scale coffee-brown, 5 mm. long, 3½ broad, 2½ high. The smaller, which were more numerous, 4 mm. long, 2½ broad and 2 high. Dorsum quite convex. Texture of the scale thin, somewhat shiny. Cleared and mounted, well-boiled examples are colourless, while those not so are of a yellowish-brown. Skin minutely pitted. Antennæ 7-jointed. Measurements in μ: Joint 1 (48), 2 (44), 3 (60), 4 (64), 5 (28), 6 (24), 7 (52). Sometimes joints 3 and 4 are equal; 1 and 2 seem to be variable, often equal, and in this case they would measure 40 μ long, respectively; joint 7 is very constant at 52 μ long. Legs ordinary. Margin with two rows of spines, one short and stout, the other short, thin and sharp, 16 and 8 μ, respectively. Spines of the lateral cleft in threes, nearly of equal lengths, although in some the centre one would be the longest.

Hab.—On plum trees at Niagara, Ont.; sent to me from the Division of Entomology of the Canadian Department of Agriculture, and named after J. A. Guignard, Asst. Entomologist, Experimental Farm, Ottawa. Newly-hatched larvæ translucent, with a slight tinge of pale green and with a distinct dark greenish-gray dorsal longitudinal band. In about six days the colour changes to a light yellow. Antennæ 6-jointed: Joint 1 (20), 2 (12), 3 (28), 4 (12), 5 (16), 6 (32). Front leg: coxa 24; femur and trochanter 52; tibia 40; tarsus 24 μ long. Anal tubercles long, each with one long bristle and one short spine. Marginal spines 12 μ long. Anal ring normal, with 6 bristles. The above described species has considerable resemblance to *Eulecanium vini* of Europe, but is described as new, after a careful study of various species and reference to all the literature at my disposal.

Lecanium pini, n. sp. (Native.) ♀.—Scale dark coffee-brown, 5 mm. long, 4 broad, 3 high. Antennæ rudimentary, although in some examples studied some showed a distinct three-jointed antenna, joint 2 longest, 9 a little longer than 1, measuring in μ: Joint 1 (20), 2 (48), 3 (28). Length of the antenna 96 μ. The third joint has a few short

hairs, about seven. Legs apparently wanting. Derm colourless, with the posterior half showing small round gland-pits. Posterior incision very long. Anal plates and around the anal area dark yellow. Newly-hatched larvæ dark ochreous, of the ordinary type, indistinctly 6-jointed, seemingly with only 5 distinct joints: Joint 1 (20), 2 (24), 3 (56), 4 (32), 5 (52). Front leg: coxa 44; femur and trochanter 80; tibia 56; tarsus 48 μ long. Anal tubercles with one long bristle and two short spines. Rostral loop large.

Hab.—On *Linus Austriaca*, London, Ont. Coll., Mr. John Dearness. Received since from Prof. E. P. Felt, State Entomologist of New York. Prof. Felt's scales were taken at Kierner, N. Y., and are seemingly rare, as he found only a few at this time. Mr. Dearness found his in quantities. In each case the scales were attached to the crowns of the leaves. As to the newly-hatched larvæ of *Lecanium* and *Eulecanium*, I wish to remark that in all the species yet studied by me, in the legs the tarsus is always shorter than the tibia. Mr. Maskell, Trans. N. Z. Inst., Vol. XXVIII., 1895, figures the larva of a typical *Lecanium*, and says of the legs that the tibiæ are shorter than the tarsi. He does not say of what species, however.

Eulecanium Lymani, n. sp. ♀.—Scale red-brown, distinctly pointed at each end, convex. Texture very thin, 3 and 4 mm. long, 2½ broad, 1½ high. Antennæ 6- and 7-jointed.

Measurements of joints in μ:

Joint —	1	2	3	4	5	6	7
	32	40	56	40	24	24	48
	40	40	52	52	24	20	44
	32	40	100	20	24	48	

Middle leg: coxa 60; femur and trochanter 140; tibia 100; tarsus 64 μ long. Marginal spines short, sharp, 20 μ long, easily lost in boiling. Derm yellowish; no pits observed.

Hab.—On a young oak at Quebec. The tree was 10 ft. high, growing by the roadside, adjoining a grove of trees, and quite a distance from any farm, house or garden. The upper part of the tree was very badly affected. Collected by Mr. Henry H. Lyman, after whom I have the pleasure of naming the species. Allied to such species as *Eulecanium Maclurarum*, Ckll. It seems to be very distinct and much different from any other *Eulecanium* found to infest oak trees. Just recently the Dominion Entomologist sent me the same thing on oak. Coll., Miss Lucy I. May, at North Hatley, Quebec.

Eulecanium rosæ, n. sp. (Native.) ♀.—Scale in many examples studied practically hemispherical, resembling in shape a small split-pea. Approximate size 4 mm. long, 3½ broad, 3 high. The colour is variable in the adult stage, light red-brown to a yellow-brown, considerably wrinkled and pitted, with a dull glossy surface. Texture moderately thick. Cleared and viewed by transmitted light, the skin is brownish, showing many round gland-pits of two sizes. Antennæ 6- and 7-jointed, measuring in μ:

Joint—	1	2	3	4	5	6	7
	44	44	56	52	24	20	48
	40	44	96	24	24	44	

Joint one has 1 long hair; two 1 short; three has 2 long ones near the constricted end of the joint; four and five each have a short hair; six has 3 short, and seven has three whorls of hairs. Leg: coxa 80; femur 72; trochanter 128; tibia 112; tarsus 60; tarsal digitules 40 μ long; claw digitules 24 μ long. Width of coxa 52 μ, of the trochanter 40 μ.

Hab.—On rosebush at Sherbrooke, Quebec; found by Mrs. Brooks (Dr. Fletcher in litt.). *E. rosæ* differs very materially from the European *Lecanium (Eulecanium rosarum)* by the scale being nearly circular in outline, and having a 6- and 7-jointed antenna, while *E. rosarum* has a 7- and 8-jointed antenna.

(To be continued.)

CORRIGENDUM.—Page 315, instead of lines 4–6, read: "♀ Kahnförmig, im Alten über halbkuglig, uneben, dunkelbraun. Die Eier ohne wollige Einhüllung. Länge 3 Linien. Am Weinstocke."

A NEW MEALY-BUG ON GRASS-ROOTS.

BY T. D. A. AND W. P. COCKERELL, EAST LAS VEGAS, N. M.

Dactylopius roseotinctus, n. sp.

Form and size about as in *D. Citri;* pink, distinctly segmented, with a slight covering of mealy powder; caudal tassels short but well-developed; lateral fringe of tassels very short, irregular, but plainly visible in fresh specimens. Females full of young show no signs of producing ovisacs.

Antennæ 8-jointed, joints measuring in μ: (1) 45–66, (2) 51–60, (3) 45–48, (4) 39–45, (5) 42–45, (6) 30–36, (7) 30–36, (8) 84–93. Middle leg: Femur and trochanter 240 μ, tibia 210, tarsus (without claw) 78.

Breadth of femur, 84 μ. Labium, length 135, breadth 90 μ. Caudal bristles and bristles of anal ring of the same length, 120 μ.

Boiled in caustic potash, the females turn bright red.

Hab.—Romeroville, New Mexico, on roots of grass, Nov. 9, 1901 *(W. P. Cockerell).*

Closely allied to *D. salinus*, Ckll. (from California), but the femora are stouter, the labium is broader, and the caudal bristles are much longer. The antennæ are curiously like those of the Brazilian *D. secretus*, Hempel. *D. roseotinctus* is also very similar to *D. trifolii* (Forbes), which has a lateral fringe, but there are various small differences, and the colour is not the same.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

The thirty-eighth annual meeting of the Society was held in London on the 13th and 14th of November. The first morning was taken up with a business meeting of the Council. In the afternoon a conference on the San José scale in Ontario took place. Mr. Fisher, the Provincial Inspector, gave an interesting account of the present condition of the infested localities and of the work which had been undertaken for the repression of the insect during the past year. He also described very fully the remedies employed and the apparatus which had been found most useful. Dr. Fletcher gave some account of his observations in several parts of the country and in Ohio, and spoke in the highest terms of the good work done by Mr. Fisher and the wise measures adopted by the Department of Agriculture since the first outbreak of the pest. Prof. Webster (of Ohio) related his experience in dealing with the problem, which was the same in Ontario as in Ohio, and gave much useful information on the subject. The Hon. John Dryden, Minister of Agriculture for Ontario, in closing the discussion, spoke of the great difficulty he had to contend with owing to the refusal of the people in general to believe in the dangerous character of the scale. This Society, and the Fruit-growers' Associaton, should do their utmost to educate the public on this matter, and so lead them to co-operate in all measures that were adopted. He felt much encouraged by what he had heard that afternoon, and would continue to do his utmost for the extermination of the pest.

In the evening a public meeting was held at the Normal School and was very well attended. The Hon. John Dryden, who presided, spoke in very high terms of the Society and the good work it had done during a

long series of years. He considered it one of the most useful associations connected with his Department, and expressed the great pleasure it gave him to be present at its annual meeting.

The Rev. Dr. Fyles read his presidential address on "The Importance of Entomological Studies to the Community at Large," illustrated with beautiful diagrams that he had himself prepared. Dr. Fletcher gave an address on "The Value of Nature Study in Education," and at the close exhibited a number of lantern pictures which showed the beauty and perfection of common objects in nature.

On Thursday, November 14th, the various reports of the directors, officers, branches and sections were read, and a large number of interesting and valuable papers. These will be published in full in the forthcoming Annual Report. The election of officers resulted as follows:

President—Rev. T. W. Fyles, D.C.L., F.L.S., South Quebec.

Vice-President—Professor William Lochhead, Ontario Agricultural College, Guelph.

Secretary—William E. Saunders, London.

Treasurer—J. H. Bowman, London.

Directors: Division No. 1—C. H. Young, Ottawa.
Division No. 2—J. D. Evans, Trenton.
Division No. 3—E. M. Walker, Toronto.
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NOTE ON THE GENERIC TITLE BURTIA.

BY A. RADCLIFFE GROTE, HILDESHEIM, GERMANY.

The generic title *Burtia* was proposed by me in the first part of the Notes on the Zygænidæ of Cuba, read February 12, 1866, before the Ent. Soc. Phil., and published in July of the same year. The genus is, however, incorrectly dated "1867" by Kirby in his catalogue of 1892, where *B. rubella* seems also wrongly given as a synonym of *Gundlachia cruenta*, H.-S., the two species being presumably distinct. Now, Moeschler had previously, in 1890 (Lep. Porto Rico, p. 349), given "*Horamia plumosa*, H.-S.," as a synonym of *B. rubella*, and "*G. cruenta*" as a synonym of *Callicarus pennipes*, thus according to my paper priority over Herrich-Schaeffer's in the Correspondenz Blatt, although these reversed references may chiefly show that Moeschler could not make out H.-S. descriptions, which are usually scanty. Kirby (p. 129) also gives *pennipes* the preference over *plumosa*, a name I cannot find in Hampson. From my copy, evidently not the original issue, I cannot find out the exact date for *Gundlachia*. Kirby dates *H. pretellus*, H.-S., as "Aug., 1866," a month later than *Gundlachia* or *Burtia*, though the former is, in my copy, on the previous page of Corr. Blatt. Under the circumstances that my paper was read in February, 1866, that Moeschler prefers *Burtia* in 1890, and that I figure it, I think my name should hold for the Cuban genus over *Gundlachia*, even if both appeared in the same month—July, 1866. Sir G. Hampson copies Kirby's wrong date of "1867" for *Burtia*, and, evidently misled by this, gives my name as a synonym, while separating the two species, *B. cruenta* and *B. rubella*, and figuring *rubella* on Plate XIII., Fig. 9, of his exhaustive work on the Syntomids. In the Philadelphia Check List the name *Burtia* is unnecessarily used for the Florida *Didasys belæ*, Grote, the two genera being distinct. I am not able to account for Kirby giving the date of "1867" for the genus *Callicarus*, Grote, 1866, a name he also misspells, and which is described in the same paper with *Burtia*. Probably the correct date for *Horamia plumosa*, H.-S., is August, while that or *Callicarus pennipes*, Grote, is certainly July, 1866.

SPECIES OF BRACHYCISTIS (FAM. MYRMOSIDÆ) FROM SOUTHERN CALIFORNIA.

BY T. D. A. COCKERELL, EAST LAS VEGAS, N. M.

Brachycistis gaudii, n. sp.— ♂. Length about 6½ mm.; shining black, brown on prothorax, at bases of wings, and at extreme (usually covered) bases of abdominal segments; antennæ long, dull reddish-brown, first joint of flagellum equal to second; head broader than thorax; eyes very prominent; ocelli in an equilateral triangle, the area between them elevated; edge of clypeus, and mandibles, dark ferruginous, the latter tridentate; mesothorax shining, hairs and punctures very sparse; metathorax minutely transversely lineolate; tegulæ light ferruginous; wings hyaline, iridescent, nervures pale except the costal, stigma large, dark brown; three submarginal cells and two recurrent nervures, the second recurrent sometimes failing below; marginal cell extremely short, broader than long, its greatest diameter about half length of stigma; first submarginal large, extending along stigma to marginal; second submarginal minute, triangular, entirely cut off from marginal; third submarginal minute, long and narrow, its tip reaching marginal; first recurrent nervure joining first transverso-cubital, second joining third submarginal cell near its base; abdomen shining, very sparsely punctured, with long sparse yellowish hairs; first segment swollen, about twice as long as broad, with a deep constriction between it and the second; apical curved spine long, ferruginous; legs black, knees, apices of tibiæ and tarsi light brown.

Hab.—La Jolla, San Diego Co., California, at light, Aug., 1901. 3 ♂. Allied to *B. elegantulus*, but different in colour, and the venation is not quite the same. Also related to *B. contiguus*, Fox, but the middle segment is not finely punctured posteriorly, and the venation differs.

Brachycistis carinatus, Fox, 1899.—San Pedro, Cal., July 9; La Jolla, Cal., August. Three males. The eyes are black, not pale castaneous as Fox describes; perhaps his specimen had been in alcohol. This insect comes to lights at night, and represents *B. glabrellus* on the coast of Southern California. It was hitherto known from one example, vaguely said to be from California.

We regret to record the death of Mr. P. C. Truman, of Volga, South Dakota, which occurred on the 27th of October, the result of an attack of pneumonia. He began collecting insects about seventeen years ago, and by diligent work succeeded in forming what is considered to be the finest collection of Lepidoptera in the North-western States, and also a good collection of Coleoptera.

Mailed December 10th, 1901.

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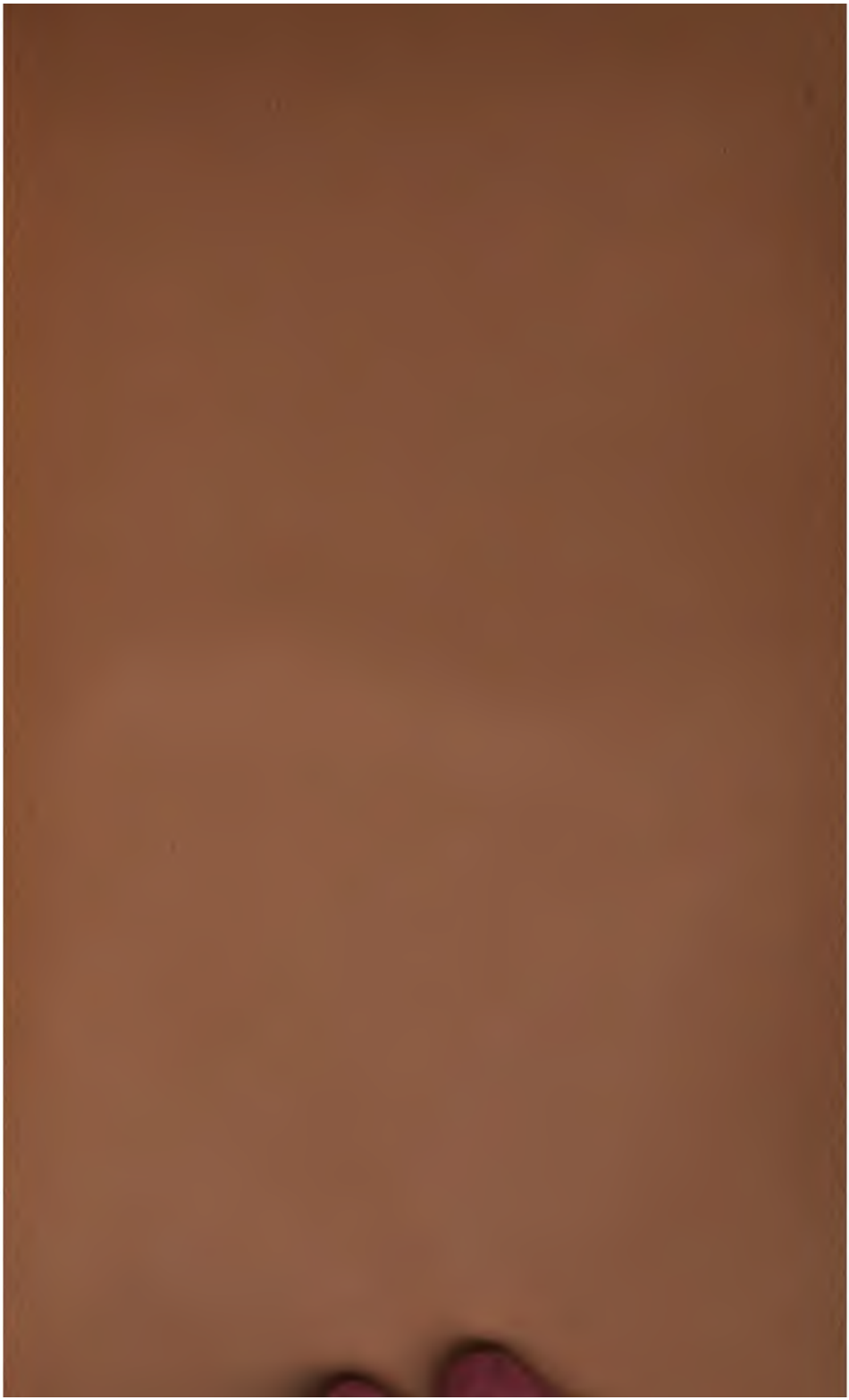
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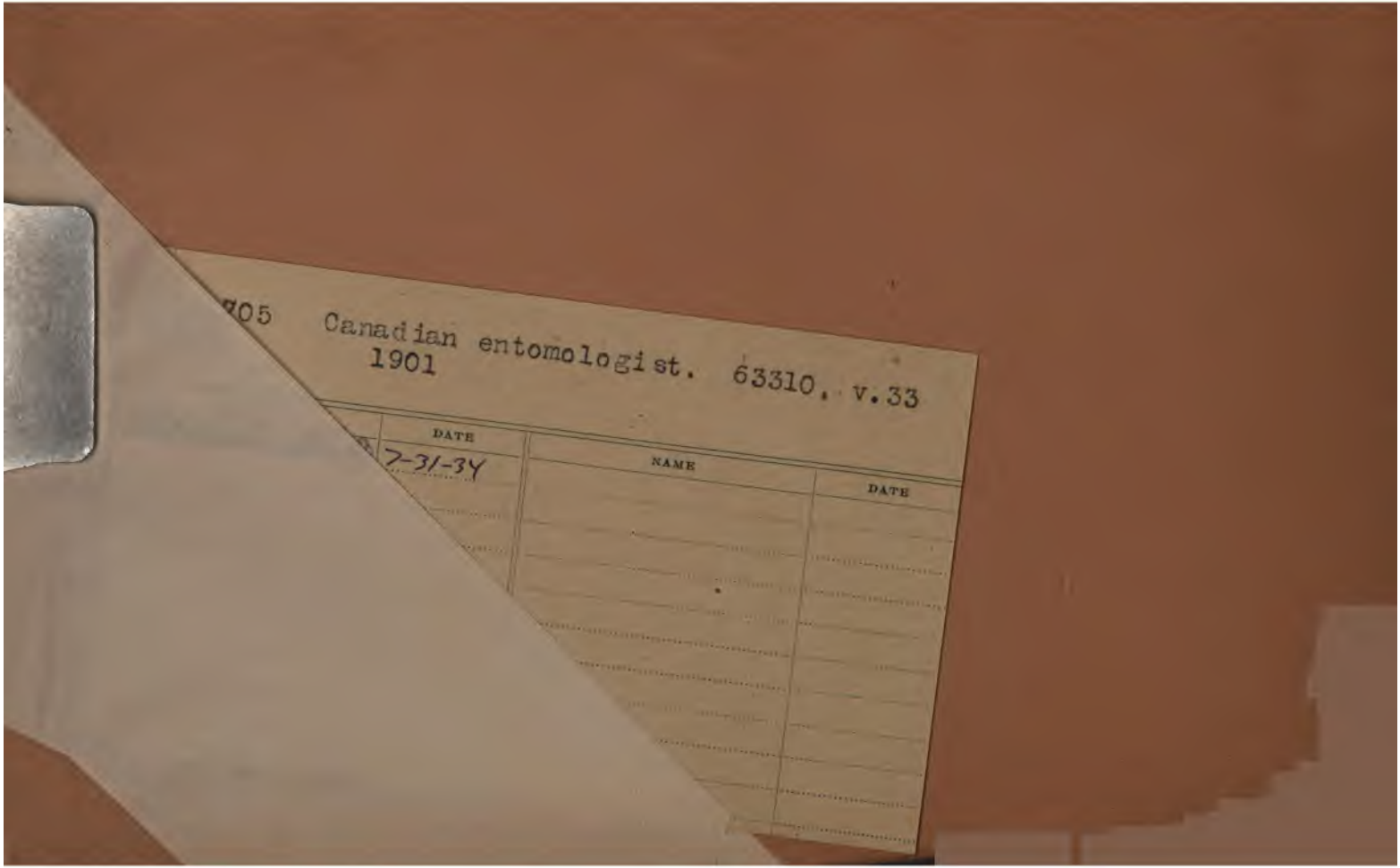
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